

# The Economics of **Money, Banking and Finance**

A European Text

Third Edition



**PETER HOWELLS  
& KEITH BAIN**

# The Economics of Money, Banking and Finance

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THIRD EDITION

# The Economics of Money, Banking and Finance

A European Text

PETER HOWELLS and KEITH BAIN

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When we produced the second edition of this book some four years ago we made a number of structural changes from the first edition. In producing this third edition, we have left the structure untouched. There are, however, some significant changes to content and some of these may influence the way in which tutors and students wish to use the book.

### Updates

Firstly, as always, we have updated the material where necessary. Since we have always had great faith in the power of illustration and example both to motivate and to explain, we have always used copious extracts from the *Financial Times* (and other sources) with the result that updating is a major task. While finding more recent illustrations involved a lot of work, it was not particularly difficult. This suggests to us that the issues we thought important in the second edition have continued to be so. Markets remain volatile and their movements continue to pose a challenge to orthodox theories of valuation; financial products continue to be mis-sold; the innovative ingenuity of financial firms continues to drive the dialectic relationship with regulators.

Some things do change, however. Europe is more integrated and, from 2004, much larger. Although we still devote four chapters to the financial systems of eight different countries, we can no longer say anything distinctive about the monetary policies of more than half. With the mergers of financial markets currently taking place, we shall soon lose another set of distinctive features. A future edition may well have to recognize a genuinely 'European' (i.e. continental) financial system. This trend is very noticeable in the *Financial Times* and the current arrangement of its tables. These have been revised substantially since our last edition and updating our comments and guidance on those tables has been a major effort.

When we put together the first edition of this book, the main issue for monetary policy was the independence of central banks. More recently the issue has become the **transparency** with which central banks conduct monetary policy. The anomalies confronting the efficient market hypothesis have not gone away; if anything they have increased and this has given rise to interesting developments under the heading whereby some economists, dissatisfied with simply *assuming* that agents make the best use of all relevant information, have gone and asked the psychologists what they have discovered *by experimentation* about the way in which people process information. This approach, often labelled **behavioural finance**, has produced some interesting results.

We have found room for at least some brief discussion of both issues by reducing some of the history of financial institutions and by largely removing the monetary base/fractional reserve model of money supply determination. In the real world, central banks set interest rates and the money supply is endogenously determined. Since we all know this, there seems little point in confusing students with an alternative approach that was condemned as amounting to misinstruction more than 20 years ago.

From our point of view, the biggest event, even since the second edition, has been the explosion of relevant material available on the internet. Central banks and governments, for example, have been at the forefront of publishing statistics, research papers, policy documents etc. as part of the enthusiasm for transparency and openness. Everything published by the Bank of England is freely available on its website. Representative trade bodies have been almost as good. It is now a fairly easy task to get information both about volumes and values of trades and also about trading procedures from associations representing national stock exchanges. Organizations representing insurance companies, unit

and investment trusts describe their products in great detail and usually provide useful statistics. Individual firms also have websites which may be aimed primarily at marketing their products but can often provide information of more general value. French banks, in particular, seem to have a highly developed sense of educational responsibility. In the last few years, the most striking development has been the growth of websites devoted to the study of a particular issue, the ‘efficient market hypothesis’ or ‘behavioural finance’ are examples. In every book we have ever written we have stressed the importance of students learning how to find out for themselves. This was the main reason behind our original decision to write a book about financial activity which drew repeatedly on the coverage provided by the *Financial Times*. But while the *FT* remains probably the pre-eminent printed source of financial news and comment, the internet has rapidly become a major resource. For this reason we have tried to feature the most helpful internet sources. Our guidance to these is contained in a new visual feature headed ‘**more from the web**’ scattered widely through the book. While these are obviously meant to be helpful, two notes of caution are necessary. Firstly, we can only refer to the sites we know of and use. There must be many others, possibly hundreds, and possibly better, that we do not know about. Secondly, the internet technology not only provides very low cost of entry, it offers very low costs of editing and design. The consequence is that websites are frequently ‘updated’ and re-designed. The directory structure changes and documents are moved from one directory to another. Anyone who has given the internet address of a document to a student knows the frustration that can be caused by the subsequent error message insisting that it is not at that address. There is not much we can do about this. It is one of the weaknesses of the internet. What we have done, however, is to explain how we navigated, step by step, to the appropriate source. This means that even if the directory structure changes (invalidating any URL we may have given) readers will know in what part of the website we found the document and may still be able to navigate to it.

### Using the book

As we said at the outset, the book remains divided into six sections:

- Introduction
- Institutions and systems
- Theory
- Money and Banking
- Markets
- Current Issues

With the exception of ‘Introduction’ which is a single chapter, each of the other five sections can form the basis of a one semester course. Sequence is not important except that students should cover the material in ‘Theory’ before attempting either ‘Money and Banking’, ‘Markets’ or ‘Current Issues’. Tutors should bear in mind that there is a companion website which provides suggested answers to end of chapter questions as well as additional work, yet more reading and exercises.

### Additional materials

In addition to the book’s Companion Web Site and the detailed guidance to what is available on other websites, tutors using this edition have access to two sets of ‘PowerPoint’ slides. With many textbooks, the practice has been to use these slides to provide a visual synopsis of each chapter so that the structure of the book determines the structure of the slide sequence.

We have opted for a different approach, which is to provide two sets of slides that we know, from experience, could be used as the basis for a taught course. Both sets of slides are based upon two courses taught at the University of West England, Bristol. These are whole year courses (approximately 24 weeks) in respectively the Economics of Money and Banking (EMB) and the Economics of Financial Markets (EFF). Both courses are based on this book, but they require students to consult a range of other sources both printed and web-based. The EMB course uses material selected from the first four sections of the book. The EFF course uses material taken from ‘Introduction’, ‘Theory’ and ‘Markets’ sections. Each group of slides, corresponding to a lecture, makes it clear to which chapter it relates, together with any additional material that students need to consult.

## Acknowledgements

A feature of this book is the guidance it gives to students on reading the financial press. We have reproduced extensive material, both tables and commentary, from the *Financial Times*. We are pleased to acknowledge that this project would not have been possible without the permission and cooperation of its publishers.

In addition, we need to thank all those who have encouraged and helped us to put this new edition together – and have pointed out errors in earlier editions. Most directly involved are Hans-Michael Trautwein and Murray Glickman who have both provided specialist material. Murray, as well as contributing on the subject of institutions, has taught from the book for a number of years and has made helpful suggestions through-

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## Symbols, abbreviations and other conventions

$AI$	Accrued interest	$i_d$	Domestic interest rate
$\alpha$	The cash ratio of the non-bank private sector (= $C_p/D_p$ )	$i_f$	Foreign interest rate
$\beta$	Banks' reserve ratio (= $(C_b + D_b)/D_p$ )	$I\text{£}$	Irish punt
$\beta$	Beta coefficient (of an asset)	$K$	The return on an asset
$B$	The monetary base	$\hat{K}$	The expected return on an asset
$B\text{Fr}$	Belgian franc	$\bar{K}$	The required rate of return on an asset
$C$	Coupon payment	$K_m$	The rate of return on a 'whole market portfolio'
$c$	Coupon rate	$K_{rf}$	The risk-free rate of return
$C_b$	Notes and coin held by the banking system	$L$	Italian lira
$C_c$	cost of carry	$L_g$	Bank loans to the government
$C_p$	Notes and coin held by the non-bank private sector	$L_p$	Bank loans to the non-bank private sector
$cy$	Current yield	$M$	The par or maturity or redemption value of an asset
$\Delta$	Change in	$M_D$	Demand for money
$d$	Rate of discount	$M_S$	Supply of money
$d$	The Eurobank redeposit ratio	$M1$	$M1$ monetary aggregate
$D_b$	Deposits of the banking system at the central bank	$M2$	$M2$ monetary aggregate
$D_g$	Deposits of the government	$M3$	$M3$ monetary aggregate
$D_p$	Deposits of the non-bank private sector	$M4$	$M4$ monetary aggregate
$Dkr$	Danish krone	$N$	Total employment
$DM$	Deutschmark	$n$	Total number (e.g. of time periods)
$Dr$	Greek drachma	$n_{im}$	Length of time from date of issue to maturity
$\text{€}$	euro	$n_{lc}$	Length of time since last coupon payment
$Ecu$	European currency unit	$n_m$	Length of time to maturity
$E_S$	Portuguese escudo	$n_{sm}$	Length of time from settlement of purchase to maturity
$E_F$	Forward exchange rate expressed in direct quotation	$n_{tc}$	Length of time to next coupon payment
$E_R$	Real exchange rate expressed in direct quotation	$n_{xc}$	Length of time from ex dividend date to next coupon payment
$E_S$	Spot exchange rate expressed in direct quotation	$n_{xt}$	Length of time between ex dividend date and date of calculation
$FFr$	French franc	$P$	The purchase or market price (the price level in the aggregate)
$FM$	Finnish markka	$Pm^c$	The premium price of a call option
$fl$	Netherlands guilder	$P_s$	Spot or cash price
$i$	Nominal rate of interest	$P_x$	Strike or exercise price of option

$P_x f$	Discounted option strike price	$S_R$	Real exchange rate expressed in indirect quotation
$\pi$	The rate of inflation	$S_S$	Spot exchange rate expressed in indirect quotation
$\pi^e$	The expected rate of inflation	$\sigma$	The standard deviation (of an asset's return) risk
$Pta$	Spanish peseta	$\sigma^2$	The variance (of an asset's return) risk
$Q$	The number of coupon payments before redemption	$\Sigma$	Summation (of a series)
$r$	The real rate of interest	$t$	Time period
$ry$	Redemption yield	$T$	Total number of time periods
$RR$	Required bank reserves	$TR$	Total bank reserves
$sm_y$	Simple yield to maturity	$V$	Velocity of circulation
$S_f$	Forward exchange rate expressed in indirect quotation	$\dot{W}$	Rate of change of money wages
$S_f$	Shareholders' funds	$Y$	Aggregate real output, national income
$Sch$	Austrian schilling	$¥$	Japanese yen
$SDR$	Special Drawing Right	$£$	Pound sterling
$SFr$	Swiss franc	$\$$	United States dollar
$SKr$	Swedish krone		



Part 1

# Introduction



## Chapter 1

# The role of a financial system

*What you will learn in this chapter:*

- What a financial system consists of
- Who uses it and for what purposes
- The distinctive features of financial institutions
- The distinctive features of financial markets
- Why the performance of the financial system is relevant to the rest of the economy

## 1.1 Introduction

In this chapter we want to provide preliminary answers to the questions posed on the previous page: what is a financial system, who uses it, what does it do, does it matter how it does it? Our answers are preliminary in the sense that these questions concern us throughout the book and each later chapter is looking at some aspect of these questions in more detail. The intention here is to provide an introduction – a definition of key terms and the explanation of some basic principles – for readers who have had no prior contact with financial economics, and an overview of the field, as we see it, for all readers.

We begin by defining a financial system as:

a set of markets for financial instruments, and the individuals and institutions who trade in those markets, together with the regulators and supervisors of the system.

The users of the system are people, firms and other organizations who wish to make use of the facilities offered by a financial system. The facilities offered may be summarized as:

- intermediation between surplus and deficit units;
- financial services such as insurance and pensions;
- a payments mechanism;
- portfolio adjustment facilities.

Notice that while different parts of the system may specialize in each of these functions, they all have one thing in common: they all have the effect of channelling funds from those who have a surplus (to their current spending plans) to those who have a deficit. Consider each case in turn. Banks, historically speaking, began as institutions whose function was to accept deposits from those who wished to save and to lend them to borrowers on terms which were attractive to the latter. Only later did they begin to offer a means of payment facility, based initially upon written cheques but now largely electronic. Thus, to have access to the current payments mechanism, one needs to hold bank deposits and these can be on-lent. Similarly, insurance companies and pension funds have a primary purpose which is to offer people a means of managing the risk of some major, adverse event. However, the contributions made by policyholders creates a fund which is usually invested in a wide range of securities. This purchase of

securities involves a flow of funds (directly or indirectly) to those who issued the securities as a means of raising funds. The income from the securities goes to meet the expenses of the companies' operations, including some payments to policyholders. Portfolio adjustment facilities have to provide wealth-holders with a quick, cheap and reliable way of buying and selling a wide variety of financial assets. When wealth-holders buy financial assets they are lending (again directly or indirectly) to those who issued the assets. These facilities are obviously supplied by financial markets, but they are also supplied to smaller investors by 'mutual funds' such as unit trusts. Thus, all kinds of financial activity have the effect in some degree of channelling funds from lenders to borrowers.

It is important to bear in mind that economists are usually interested in the way in which a financial system channels funds between the **end users** of the system, that is, between **ultimate borrowers and lenders**, rather than the **intermediate** borrowers and lenders – the financial intermediaries who also borrow and lend but only, as their name implies, in order to channel funds between end users. In developed economies, incomes are generally so high (by world standards) that there are many people who wish to lend; and the state of technology is such that real investment can only be undertaken by borrowing funds to finance its installation and to see firms through the often lengthy period before it earns a return. Given that there is a desire to lend and to borrow, we can get some idea immediately of why modern economies have quite highly developed financial systems.

Faced with a desire to lend or to borrow, the end users of financial systems have a choice between three broad approaches.

Firstly, they can engage in what is usually called **direct lending**. That is to say that they deal directly with each other. But this, as we shall see, is costly, inefficient, extremely risky and not, in practice, very likely.

Secondly, they may decide to use **organized markets**. In these markets, lenders buy the liabilities issued by borrowers. If the liability is newly issued, then the issuer receives funds directly from the lender. To this extent the process has some similarity to direct lending, but dealing in liabilities traded in organized markets has advantages for both parties. Organized markets reduce the search costs that would be associated with direct lending because organized markets are populated by people willing to trade. They also reduce risk since there are usually rules governing the operation of the

market which endeavour to exclude the dishonest and the extremely risky. For lenders, there is the big advantage that they can sell their claim on the borrower if, after making the loan, they find they need funds themselves. Indeed, the more typical transaction in organized markets is that where a lender buys, not a newly issued liability, but a liability which was originally bought from the borrower by another lender. In this case the lender is refinancing a loan originally made by someone else, though the borrower is completely unaware of this secondary transaction. The best known markets, of course, are the markets for company shares in Tokyo, London, New York and Hong Kong. But there are organized markets for a vast range of financial instruments, as we shall see in Part 5 of this book.

We have suggested that organized markets may be used by ultimate lenders and borrowers. But they are used also by financial intermediaries who themselves provide a third channel for the transmission of funds between borrowers and lenders. When a lender deals through an intermediary, s/he acquires an asset – typically a bank or building society deposit, or claims on an insurance fund – which cannot be traded but can only be returned to the intermediary. Similarly, intermediaries create liabilities, typically in the form of loans, for borrowers. These too are ‘non-marketable’. If the borrower wishes to end the loan, it must be repaid to the intermediary. The advantages of dealing through intermediaries are similar to those of dealing in organized markets: lenders and borrowers are brought together more quickly, more efficiently and therefore more cheaply than if they had to search each other out; and the intermediary is able, through superior knowledge and economies of scale, to reduce the risk of the transaction for both parties. One of the ways in which they do the latter is to hold highly diversified portfolios of assets and liabilities and this involves them as traders in organized markets. Indeed, most markets are probably dominated by intermediaries rather than by end users of the financial system. Figure 1.1 summarizes these three possibilities schematically.

We go next, in Section 1.2, to the question of who the end users are and the supplementary question of what are their motives and interests; in Section 1.3 we shall look at the essential characteristics of financial institutions and their role as intermediaries; in Section 1.4 we look at the broad range of financial markets and suggest some ways in which they may be ordered and classified

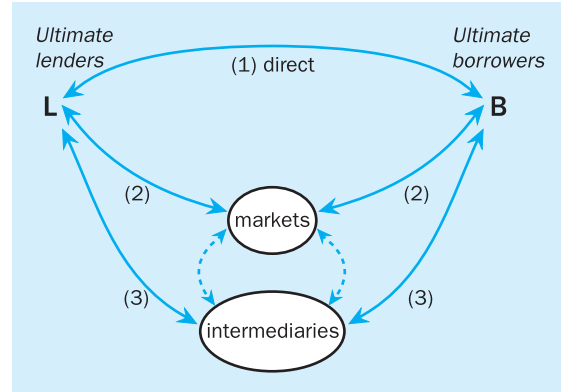


Figure 1.1 The options for lenders and borrowers

as well as introducing some of the basic principles underlying supply and demand in financial markets; in Section 1.5 we look at how all this financial activity relates to the functioning of the ‘real’ economy.

Remember, as you read these sections, that most issues are dealt with in more detail later in the book. We shall point this out as we go along.

## 1.2 Lenders and borrowers

In this section we turn our attention to the end users of the financial system – lenders and borrowers – and to their reasons for lending and borrowing. We shall see that these motives differ and in some cases conflict. The role of a financial system is to reconcile these differences, as cheaply and effectively as possible. Remember that lenders and borrowers here are *ultimate* lenders and borrowers. Their motives as lenders and borrowers are different from those of financial intermediaries who are also lending (to ultimate borrowers) and borrowing (from ultimate lenders) and frequently lending and borrowing between themselves. We must not confuse the two.

### 1.2.1 Saving and lending

As we noted earlier, it is one characteristic of developed economies that incomes are higher than many people require for current consumption. The difference between income and consumption we call **saving**. In these economies, aggregate saving is positive. These savings can



be used to buy ‘real’ capital assets such as machinery, industrial equipment and premises. Savings used in this way are being used for *investment*.<sup>1</sup>

However, many people will be saving at a level which exceeds their real investment spending. Indeed, this is generally true for households whose needs and opportunities for real investment are limited. Many households save without undertaking any real investment. The difference between saving and real investment is their **financial surplus**, and they are often described as **surplus units**. It is this financial surplus that is available for lending and it is this that gives rise to a *net acquisition of financial assets*. Notice that we say ‘available for lending’. It does not have to be lent. It is perfectly possible for those with a financial surplus to accumulate what used to be called **hoards**. That is to say, they could use their surplus to build up holdings of money. Borrowing from the vocabulary of computing, we might say that the accumulation of money holdings is the ‘default’ setting. This is what happens to those with a financial surplus if they make no conscious decision to do otherwise. They receive their income in money form (usually by the transfer of bank deposits). They use some of that (money) income to make consumption purchases. If consumption is less than income they have positive saving. Assume, for simplicity, that their real investment is zero. Their saving is simultaneously a financial surplus and if they make no positive decision about its allocation it will, by default, accumulate in the form of bank deposits. If they do this, they are not lending.<sup>2</sup>

This distinction between saving and lending, revolving around people’s desire to hold money as a financial asset, was once a crucial issue in economics. It lay at the centre of contrasting views about the determination of interest rates, as we shall see in Section 9.3.

We can sum up what we have just said in the following identity:

$$(Y - C) - I = NAFA \quad (1.1)$$

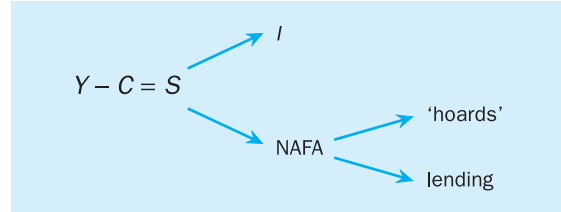


Figure 1.2 Possible uses of saving

where  $(Y - C)$ , income minus consumption, is saving;  $I$  stands for real investment; and  $NAFA$  stands for the *net acquisition of financial assets*. Figure 1.2 summarizes the position more schematically, and also emphasizes the point that the net acquisition of financial assets is equal only to *potential* lending. The accumulation of ‘hoards’ is an acquisition of financial assets (money) but is not, as we know, lending.

What conditions have to be met to induce those with a surplus to lend? As a general principle we shall say that lenders wish to get the maximum **return** for the minimum of **risk**. It is also assumed that lenders have a positive attitude toward **liquidity**. We look at each in turn.

The *return* on a financial asset may take one or more of a number of forms. It may take the form of the payment of interest at discrete intervals. This is the case, for example, with a savings deposit which is, in effect, a loan to a savings institution. Interest is also paid on bonds, though there is also the possibility with a bond of selling at a profit and making a capital gain. With company shares, the attraction of capital gain for some investors is at least as important as the periodic payments, which are variable because they are ultimately related to the firms’ earnings. Some assets, when newly issued, are sold at a discount to the price at which they will later be redeemed, their maturity value. This discount functions, therefore, rather like a capital gain – one pays less for the asset

<sup>1</sup> UK readers need to be careful with the use of the term ‘investment’. Economists use the term strictly to refer to the purchase of real, physical, assets whose purpose is to contribute to the production process. The printed and broadcast media, following the financial press, use the term investment to refer to the acquisition of financial assets. These are quite distinct activities. It is probably too late to insist on the use of ‘investment’ being confined to its original sense. When there might be any ambiguity, we shall use the term ‘real investment’ to refer to the purchase of capital equipment.

<sup>2</sup> Readers who are puzzled by this (because they are tempted to think that the accumulation of money balances, if it is in the form of bank deposits, still results in lending because banks have more deposits to lend) should think carefully and then read footnote 1 in Chapter 9. Definitions of money and details of the money supply process are dealt with in Chapter 12.

than one receives on its disposal. This discount can be expressed as a fraction (usually of the maturity value) and in this form, known as a *rate* of discount, it can be compared with other rates of return. Discounting is most commonly used in connection with treasury or commercial bills – tradeable securities of short duration. We look at the returns on different types of asset, and at the factors determining those returns, in our discussion of individual markets in Part 5 of this book.

*Risk* in a financial context is usually taken to refer to the probability that outcomes may differ from what was expected. It takes a number of forms. For the moment we may note that lenders are faced with the possibility of **default risk** (the borrower fails to repay when expected); **income risk** (the asset fails to yield the return expected); **capital risk** (the asset's nominal value differs from what was expected) and **inflation risk** (the risk that the price level changes unexpectedly, causing a change in the real value of assets). One of the main disadvantages in direct lending, and hence one of the main advantages in using organized markets or specialist intermediaries, is that many lenders would find it impossible to assess accurately the risk of lending to individual borrowers. And if they could, the level of risk to which they found themselves exposed would deter them from lending, perhaps at all or certainly at anything but a very high rate of return.

Other things being equal, lenders are also assumed to prefer opportunities that offer the greatest *liquidity*. By liquidity we mean the ability to retrieve funds quickly and with capital certainty. Notice that two conditions are involved – speed and value. Any asset can be sold quickly – even a house in a depressed housing market – if the seller is prepared to incur a sufficiently large capital loss. The reasons for this positive attitude toward liquidity are quite complex but they are connected with risk and uncertainty. In making a loan, a lender is calculating that s/he does not need access to the funds for a given period. In an uncertain world, however, these calculations can go wrong resulting in inconvenience, embarrassment or, for a firm, perhaps even bankruptcy. The ability to retrieve funds quickly, and at a value that can be depended upon, is a positive attraction in any lending opportunity.

## 1.2.2 Borrowing

At the same time that some people have income which is in excess of their current consumption needs, there will be those – firms, households, public authorities – whose incomes are insufficient for their current spending plans. This will usually be because they are planning to spend on large, expensive, ‘real’ assets of a kind which last for many years. Their need to borrow this year, therefore, may be offset in future by years when saving is the norm. For households, such purchases will typically be major consumer durables, cars or even houses perhaps. For firms, it will be real capital equipment which they hope will add to their cashflow in future and will help them to service and repay the loan. In certain circumstances, however, one can envisage people borrowing in order to purchase financial assets. Notice that this is not likely to be a common situation since it is saying that borrowers can borrow funds at a lower cost than the return that they can get from the financial assets they purchase. This is extremely rare for the personal sector. It is usually much more expensive for individuals to borrow funds than it is for firms or public bodies. A personal loan will cost much more than a firm has to offer on its shares or bonds. But there may have been cases, the Wall Street boom of 1928–29 and the big bull market of the mid-1980s, where people and non-financial institutions have thought, rightly or wrongly, that they could borrow in order to earn a profit from financial assets.

### More from the web Consumer borrowing

To find the latest figures for net new lending to UK consumers month by month go to the statistical section of Bank of England's website:  
[www.bankofengland.co.uk/mfsd](http://www.bankofengland.co.uk/mfsd)

Click on ‘Bankstats’ and then on ‘tables’.

The figures you want are on page 2 of table A5.6. The table also shows the total amount of consumer credit outstanding.

Similar figures, for the total amount of bank credit outstanding to French consumers at the end of each quarter, can be found in the statistics section of the Banque de France's website:

[www.banquedefrance.fr/gb/stat/main](http://www.banquedefrance.fr/gb/stat/main)

Click on ‘Time series’ then on ‘Debts and liabilities of French credit institutions’.

Those who wish to spend (on consumption and real investment) in excess of their income are said to have a **financial deficit** and they are sometimes referred to as *deficit units*. We saw earlier that surplus units must acquire financial assets as a consequence of their financial surplus; deficit units must either shed financial assets (accumulated in the past) or incur financial liabilities (debts). The latter are *borrowers*. Both groups are engaged in the ‘net acquisition of financial assets’. The vital difference is that for the former the net acquisition is positive while for the latter it is negative.

The interests of borrowers are mainly twofold. Firstly, they will wish to minimize *cost*. The cost to the borrower is the yield to the lender and may take any one of the number of forms we described above. Notice though that in addition to wanting to borrow at minimum cost, borrowers may also have definite preferences about other terms on which they borrow. For example, a young firm engaged in rapid expansion may prefer to borrow by issuing shares. In the early stages, earnings may be small, a high proportion will be ploughed back into the business and dividend payments will then be small. But shareholders may be willing to hold shares on these terms because they look forward to capital gains as the firm expands. The alternatives, bond issues for example, mean that the firm commits itself to an outflow of funds right from the start. This cash drain could be critical in the early stages of expansion.

Secondly, and in contrast with lenders, borrowers will wish to maximize the period for which they borrow. This has two benefits. It reduces the risk that the lender will have to be repaid at a time which is inconvenient to the borrower, and also reduces the exposure of the borrower to the risk that the loan might have to be replaced at a time when interest rates have risen.

Table 1.1 summarizes the contrasting interests of lenders and borrowers. A (+) indicates a desire to maximize and a (–) shows a desire to minimize.

**Table 1.1** The priorities of lenders and borrowers

Lenders		Borrowers	
Return	(+)	Cost	(–)
Risk	(–)	Length of loan	(+)
Liquidity	(+)		

### 1.2.3 Lenders, borrowers and the net acquisition of financial assets

Let us summarize. Lenders are a subset of those with a financial surplus. Surplus units are those whose income exceeds consumption and any spending on real capital assets. Their financial surplus ensures that their net acquisition of financial assets is positive. Lending results from the acquisition of financial assets which create loans for borrowers.

Borrowers are a subset of those with a financial deficit. Deficit units have income which is insufficient to meet their planned spending on consumption and real capital assets. Their financial deficit ensures that their net acquisition of financial assets is negative. This ‘negative acquisition’ may involve disposing of existing financial assets or it may involve acquiring liabilities. Those that take the latter course are borrowing.

We are all familiar with the rule that any asset must be someone’s liability. (Even notes and coin, which are sometimes dignified with the special label ‘outside money’, are technically speaking liabilities of the government.) It follows, therefore, that in the aggregate, financial surpluses and deficits must cancel out. This is simplest to see if we imagine a closed economy. A closed economy is conventionally divided into three sectors: households, firms and the government sector. As a general rule, it is assumed that households run a financial surplus. As we have noted, households spend very little on real investment. By contrast, the business sector is assumed to run a deficit. If the government sector runs a balanced budget, then it follows that the size of the household surplus must match the size of the firms’ deficit. If, as frequently happens, the government sector runs a deficit, then the household surplus must match the combined deficits of government and firms. The same principle must hold if we expand the model to incorporate an external sector. *In the aggregate, sector deficits and surpluses must sum to zero.*

In most economies it is possible to find values for all our relevant terms. Figures for income (*Y*), consumption (*C*), saving (*S*) and real investment (*I*) can be found in the *national income accounts*. The usual practice is then to transfer the difference between *S* and *I* to what are called the *financial accounts*. Capital grants (*K*) and transfers (*KT*) are then added in order to yield the financial surplus or deficit and the main function of the financial accounts is to show how sector surpluses or deficits are financed. One of the accounts, for example, will show the household sector’s total

sales and purchases of each class of financial asset or liability. The net balance of these sales and purchases matches, in theory, the size of the surplus. Inspection of any country's financial accounts reveals two striking features. The first is that a sector's net transactions in financial assets and liabilities very rarely match the size of the surplus or deficit exactly. There are usually quite large residual errors in financial accounts. The second is that the total volume of transactions (as opposed to their net balance) is much greater than that required to fund a deficit (or dispose of a surplus). The reason is obvious on reflection. People trade in financial assets not just to fund this year's deficit or to dispose of their current surplus. They are, in addition, continually rearranging their financial wealth in response to what they see as important changes in the risk and return characteristics of assets.

#### 1.2.4 Lending, borrowing and wealth

As in all branches of economics, it is important in financial economics to distinguish between stocks and flows. While flows are very important, and it is flows that we have so far been discussing, there are times when stocks matter.

For example, a person with a current financial surplus is adding to his or her stock of financial wealth. A person with a current financial deficit must either run down his or her stock of assets or add to his or her stock of debt. A (flow) surplus leads to an increase in the stock of net financial wealth; a (flow) deficit leads to a reduction in that stock.

Notice that we talk here, as we did with the flows of lending and borrowing, of 'net' positions. People will hold simultaneous debtor and creditor positions. People with mortgages on their homes will also hold building society deposits. A firm may have very substantial long-term debt as a result of recent expansion while simultaneously holding a large sum in a high-interest bank account.

This looks strange at first sight. After all, financial intermediaries make their profit by, *inter alia*, charging more to borrowers than they pay to lenders. For some people, many individuals for example, this differential or 'spread' is very large. Surely, one would think, debtors with financial assets would be better off if they disposed of the assets and used the funds to reduce their indebtedness. However, this overlooks the advantages that come from having access to 'ready

money'. It ignores the advantages of liquidity. When we discussed the desires of lenders, liquidity was specified as one of the characteristics that lenders preferred in a loan. But the advantages of liquidity apply to everyone, not just to lenders. A net debtor who uses a savings deposit to pay off part of the debt sacrifices the benefit and convenience that liquidity confers – the ability to meet unforeseen demands for payment or the ability to make a purchase at an unforeseen bargain price. When it comes to calculating costs and benefits we should say that our debtor would certainly derive some benefit by using the whole of the deposit to pay off part of the loan. (The benefit would be a saving in interest payments equal to the size of the deposit multiplied by the differential between the borrowing and lending rates.) But this benefit would be accompanied by some cost – the loss of liquidity. The question for the rational debtor is whether he or she values the liquidity services flowing from his or her savings deposit at more or less than the saving in interest payments being currently forgone by holding the savings deposit. There are two important points to draw from this discussion. The first is that financial decisions typically depend upon 'spreads' or differentials between interest rates. However, we are used in economics to the idea that people make decisions on the basis of *relative* prices, so there is nothing new here. The second is that the costs and benefits of financial assets and liabilities are not fully captured by their *pecuniary* characteristics. People hold zero-interest sight deposits because the liquidity benefits outweigh the value of interest that could be had from a time deposit.

Clearly, in making decisions to acquire financial assets and liabilities, people are faced with a very complex choice. The choice is not just about whether to be a borrower or a lender but about the amount of both borrowing and lending that they should undertake. It also involves a choice about the best mix of types of asset and liability for their particular circumstances. When they are making these decisions, people are said to be exercising their **portfolio choice**. As we have seen, exercising portfolio choice involves arranging the portfolio, the mixture of assets and liabilities, in such a way that, for a given cost, the benefit derived from each asset or liability is equal at the margin. When this is the case, there is no incentive for further rearrangements and investors are said to be in **portfolio equilibrium**. The study of the principles underlying portfolio choice is known as the study of **portfolio theory**. We shall look at these principles in the next chapter.

### 1.3 Financial institutions

Financial institutions come in lots of different forms and offer a variety of services. Broadly speaking, we may say that financial institutions specialize in one or more of the following functions:

- providing a payments mechanism;
- providing a means of lending and borrowing;
- providing other services, such as foreign exchange, insurance and so on.

Notice, however, that whatever their most obvious function might be, they all have the effect that the institution mediates between those who have a financial surplus and those who have a deficit. Whatever their apparent purpose, they all share the characteristic that they offer many different types of loans to borrowers and create a wide range of assets for lenders. ‘Banks’ which provide the payments mechanism, for example, do this by accepting deposits which they lend on to borrowers. Other institutions, for example, offer insurance cover or benefits which are paid to the saver conditional upon certain events taking place – the ending of the savings contract or retirement. The firm provides these benefits as a result of investing its clients’ contributions in a variety of financial assets. We shall see in Chapter 2 that when we discuss the financial institutions which (together with markets) make up a financial system, we often divide such institutions into two groups. The first is ‘banks’, or what in most countries we might call ‘deposit takers’, and ‘other’ (or non-deposit-taking) financial institutions. The former are discussed in Chapter 12. Discussion of the latter is distributed through the chapters devoted to each country’s financial system in Part 2 of the book. This is partly because banks in any financial system fulfil broadly similar roles and operate in broadly similar ways, while individual countries show wider variation – reflecting their individual histories and development – in non-bank institutions. The major reason for this distinction, however, is that deposit-taking institutions have one peculiar feature which distinguishes them from other financial institutions, and economists regard the distinction as potentially important. This is that their liabilities are used as money. An expansion of bank business, therefore, almost invariably involves an increase in the money supply. We shall see in Section 1.5, and in Chapters 12 and 13, that the creation of money may have particular effects on the economy. This means that

banks tend to be subject to special regulation, since a bank failure can have very damaging effects upon the payments mechanism, and also that they are continually affected by the monetary policy that governments choose to pursue. For the rest of *this* section, however, what we say about financial institutions applies equally to banks and non-deposit takers.

#### 1.3.1 Financial institutions as firms

Financial institutions are firms and we can analyse their behaviour in much the same way that economists would analyse the behaviour of any firm. We can imagine them taking various inputs – premises, labour, technology, raw materials – and producing outputs of various kinds. They do this with much the same objectives in mind as any other firm and in the process costs and revenues behave much as they do for other firms. We look at each in turn, noting distinctive features of financial firms where appropriate.

Like most firms, financial institutions hire labour and own or rent specialist premises. In recent years, particularly in the recession of the early 1990s, there have been sharp increases in labour productivity as market pressures have forced firms to cut costs. This has been helped in large measure by technological developments, particularly in computing. Technology has also had its effects upon the ‘land’ element of inputs. For many years it was accepted, particularly by deposit-taking institutions, that a high street presence was essential to the attraction of customers. This led to large-scale investment in expensive premises located in prime sites. Indeed, the cost of premises for retail financial institutions was a significant barrier to entry. The past 10 years, however, have seen the rapid growth of telephone banking and ‘direct line’ insurance companies providing services by telephone and computer terminal and using the cost savings on premises to offer competitive prices to customers.

Where inputs are concerned, the most distinctive feature for non-deposit institutions is the funds that savers wish to lend. These are invested with the institution in order to earn insurance or pension benefits, or to accumulate shares in managed funds of securities. The ‘cost’ of these inputs consists of the cost of administering the account together with the financial benefits themselves which the institution has to pay out. For deposit institutions the essential input is ‘reserves’. We shall see in Chapter 12 how, provided a bank or

building society has adequate reserves of notes and coin and its own deposits held usually with the central bank, it has great freedom to create loans and deposits at its own discretion. There is an organized market for these reserves (the ‘interbank market’ which we shall discuss in Chapter 15) and the cost is the rate of interest prevailing in that market, a rate of interest which is strongly influenced by the central bank.

As with other firms, we can distinguish between those costs that are fixed over some range of output and those that are variable. Also, quite conventionally, we can assume that the marginal cost of production is rising in the short run. Attracting more funds will normally mean offering greater inducements in the form of interest, or bonuses or other services, and so the unit cost of such funds will increase with their volume.

On the face of it, the outputs of financial institutions are ‘loans’ though these loans may take many different forms and may not always be easy to identify as such. In the case of banks and savings institutions the loans that they make to clients are obvious and show in their balance sheets as loans or ‘advances’ to customers. The loan nature of outputs from non-deposit institutions is not quite so obvious. Many of the funds received by insurance and pension companies are used to hold a diversified portfolio of securities purchased in financial markets. Where these securities are newly issued, the funds flow to the issuing firm and are, in effect, functioning as a loan. Many purchases, however, are purchases of existing securities from existing holders. In this case, financial institutions are in effect refinancing loans originally made by some other person or organization. We shall see in Section 1.4 that the existence of an active market for ‘secondhand’ securities, that is, for existing loans, is essential if new securities (new loans) are to be acceptable to lenders at a reasonable price.

However, to say that outputs are loans, in some form or other, is to tell less than half the story. Taken as a group, financial institutions offer a wide variety of services ranging from share dealing and share issues to tax and other forms of financial advice to the personal and corporate sectors. Indeed, in Part 2 we shall see that in some financial systems these so-called ‘off-balance-sheet activities’ have grown rapidly in recent years. Furthermore, in making funds available to borrowers, either directly or indirectly, financial institutions are making important changes to the nature of those funds. This transformation process itself may be said to be creating something and is often said to be the basis for regarding financial institutions as *financial*

*intermediaries*. We turn to this crucially important transformation process in the next section.

Continuing our parallels with other types of firm, financial institutions derive revenue from their outputs. Most obviously, this revenue accrues from the interest that borrowers pay on the loans made by financial institutions. Where institutions are holding portfolios of securities their revenue comes from the dividend and interest payments on those securities. Where institutions offer off-balance-sheet services to customers, they charge fees. Like other firms, financial institutions will maximize profits when the difference between total revenue and total cost is at its greatest, that is, at the point where marginal cost equals marginal revenue.

This is not to say that financial institutions are necessarily profit *maximizers*. It is a characteristic of financial activity that it is subject to economies of scale for reasons we shall see in Section 1.3.2. Thus most financial systems tend to be dominated by large institutions. It is clear from their publicity, as well as their behaviour, that other objectives, such as size, growth and market share, are important to them.

### 1.3.2 Financial institutions as ‘intermediaries’

Right at the beginning of this chapter we saw that, whatever specialist services an institution might provide, a major part of any financial institution’s activity was to make loans to ultimate borrowers out of the funds which ultimate lenders made available to them. In doing this, we said that they were involved in a process known as **intermediation** and that intermediation had important characteristics and consequences. What are these?

Rather obviously ‘intermediation’ means acting as a go-between between two parties. The parties will often be the ultimate lenders and borrowers but sometimes they will be other intermediaries. What are the characteristics of intermediation? The first thing to say is that intermediation involves a good deal more than simply introducing or bringing together two parties. One *could* imagine a firm offering a service whereby it maintained a register of potential lenders and potential borrowers and tried to match them up. This would work rather like a computer dating agency and rather like such agencies our firm would charge a commission for successful introduction. But this is not intermediation. If such activity has a name it is best described as

broking. The process of intermediation requires that something be created by the transformation of inputs into outputs. At its simplest we might say that what intermediaries do is:

to create assets for lenders and liabilities for borrowers which are more attractive to each than would be the case if the parties had to deal with each other directly.

Essentially what this means is that intermediaries transform funds which are made available to them normally for short periods into loans which are made available to ultimate borrowers for longer terms. This is sometimes summed up by saying that intermediaries ‘borrow short and lend long’. What is being created in this process is liquidity and we can see this most clearly if we contrast the situation of direct lending with lending via an intermediary.

Take the case of someone wishing to borrow £130,000 to buy a house, intending to repay the loan, say, over 25 years. Without the help of an intermediary our borrower has to find someone willing to lend £130,000 for this same period and at a rate of interest which is mutually agreeable. The borrower might just possibly be successful. In that case the lender has an asset (the interest-bearing loan) and the borrower has a liability (the obligation to pay interest and eventually the obligation to repay the principal). In practice, however, even if the would-be borrower employed a broker, it seems unlikely that the search would be successful. Not many people wish to lend £130,000 to a comparative stranger and for a long period of time. Even if a potential lender could be found, the scale of risk involved (in lending to an unknown individual) and the illiquidity of the loan (the funds cannot be recovered at the lender’s discretion for 25 years) would mean that the rate of interest demanded would be so high that the borrower would decline the offer.

Suppose now that some sort of savings institution were to emerge, and that it specializes in taking large numbers of small deposits, which it pools and lends as fewer larger loans and for long periods. It pays interest on the deposits and charges a higher rate of interest on the loans. Ultimate lenders and ultimate borrowers both benefit and indeed benefit by so much that they are prepared to lend and to borrow on such terms that allow the intermediary to make a profit. What are the benefits?

Firstly, provided that the institution keeps some proportion of the funds it receives in liquid form, and provided that depositors do not all wish to withdraw

deposits at once, depositors can have instant access to their funds even though the vast majority of funds have been lent for a long period. The corresponding advantage to the borrower is the availability of long-term loans, even though, perhaps, no one wishes to lend for a long period. This is a process known as **maturity transformation**.

Secondly, a benefit for lenders is that the institution can *pool* lots of small deposits which taken in isolation would be unattractive to borrowers. These deposits can then earn a rate of interest from being lent which would not have been possible before. The corresponding benefit to borrowers is that they can borrow large sums even though lenders may not wish to lend large sums.

Thirdly, by operating on a large scale, the savings institution can *reduce risk* for both parties. Partly it does this by employing staff, paid out of the interest-spread between borrowing and lending rates, to assess the risk attaching to the loans it makes. Although each individual case is assessed on its merits, there are many similarities between cases, so the staff become specialists and highly competent by virtue of experience. Institutions also reduce risk by virtue of their ability to *diversify*. They can diversify by lending to a wide variety of people and organizations in such a way that an adverse event is likely to affect only a small proportion of loans. They can also diversify their sources of funds, so that a difficulty in raising funds from one source can be offset from elsewhere. Diversification is one of the characteristics of financial intermediaries that tends to benefit from economies of scale.

Lastly, the institution reduces **search and transaction costs** for both parties. Lenders know where the institution is. They make their deposits and walk away. Borrowers likewise know where the institution is. They telephone, write, or call in. Furthermore, although each transaction is in some sense unique, each can be fitted into a broad category – housing mortgage, personal loan, business overdraft, etc. This means that the terms on which funds are accepted and lent can be standardized. There is a set of rules for each type of deposit or other contribution and a set of rules for each type of loan. Lenders and borrowers accept these terms (or go elsewhere). This avoids the individual negotiation and drawing up of contracts, with attendant lawyers’ fees and so on, that would be necessary if lenders and borrowers were to deal directly.

Clearly, this is quite a list of potential advantages. But it serves to emphasize what we said above, namely

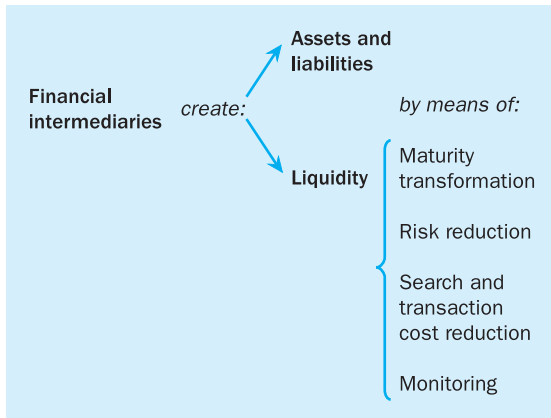


Figure 1.3 The intermediation process

that *intermediaries create something*, they do not just pass (unmodified) funds between two parties. If we persist with the idea that something is created, the best general term to use is *liquidity*. This does not quite capture all of the advantages but from an economic point of view it captures everything that matters. What intermediaries are doing is making funds available (to lenders and borrowers) cheaply, readily and with a minimum of risk. We look now at why this matters and then, in the rest of this section, we look at some of the principles which underlie the behaviour of intermediaries and which allow them to create liquidity in this way. This is a complicated story and it may be helpful to sketch it first with the help of Figure 1.3.

We shall explore firstly the general consequences of financial intermediation. The first of these is the creation of financial assets and liabilities that would not otherwise exist. The second is the creation of liquidity. We shall indicate that the latter is probably more important from an economic point of view. It is also a complex process. We shall suggest that the creation of liquidity relies in turn on four processes: *maturity transformation*, *risk reduction*, the *reduction of search and transaction costs* and *monitoring*. Furthermore, we shall suggest that all four depend to a significant extent upon *economies of scale*.

The first consequence of financial intermediation is that in the presence of financial intermediaries there will be more financial assets and liabilities than there would be without. The growth of financial activity relative to other forms of economic activity therefore implies that financial assets are growing relative to real assets. Box 1.1 provides a simple illustration of this point.

**Box 1.1 The creation of assets and liabilities**

(a) Direct lending

Lender		Borrower	
Liability	Asset	Liability	Asset
	130,000		130,000
Total	130,000		130,000

(b) via an intermediary

Lender(s)		Intermediary		Borrower	
Liability	Asset	Liability	Asset	Liability	Asset
	25,000	130,000	130,000		130,000
	26,000				
	40,000				
	39,000				
Total	130,000 (A)	130,000 (B)	130,000 (C)		130,000 (D)

Total assets (= A + C) = 260,000  
 Total liabilities (= B + D) = 260,000

In the direct lending case, our lender lends £130,000 to a borrower. As a result of the transaction, there is a financial asset of £130,000 (the loan seen from the lender’s point of view) and a financial liability of £130,000 (the debt seen from the borrower’s point of view). Strictly speaking, there has been no *creation* of anything. Prior to the loan the lender had a financial asset of £130,000, presumably in money form, so as far as the lender is concerned there is only a change in the composition of financial assets. Equally, there is no change in the total of borrowers’ liabilities. Our borrower has incurred the liability of £130,000 in order presumably to buy a real asset, a house perhaps. This asset has been transferred from a previous owner and the funds have been used to pay off the previous owner’s debts.

Suppose now that funds from several lenders equal to £130,000 are placed with an intermediary which then lends them out: additional assets and liabilities have been created. The (ultimate) lenders still have assets of £130,000 and the (ultimate) borrower has the liability of £130,000. To that extent, things are as they were in the direct lending case (except that we have multiple lenders). But in between the end users, the intermediary has also an asset (the loan) of £130,000 and liabilities (the deposits) of £130,000. Total financial assets and liabilities are now £260,000.

Whether the mere creation of additional financial assets and liabilities matters to the rest of the economy



depends upon whether people's spending behaviour is affected by the total quantity of assets and liabilities. Remember that for every extra asset created there is an extra liability. There is no increase in *net* wealth. There is no straightforward answer to this question and we shall return to it again briefly in Section 1.5. What is much more likely to matter is the creation of liquidity which has accompanied this creation of assets and liabilities. Consider the position of the lenders to the intermediary. They have interest-earning assets which they can recover at short notice. Many economists take the view that people spend more (as a proportion of their income) when they know they have liquid assets they could draw on in an emergency. Certainly, our lenders in the second case seem to be in a more enviable financial position than the lender in the first, who could be in serious trouble if expenditure happened to exceed income. Furthermore, our lenders may also benefit from intermediation by having interest-earning assets which they would not have had at all otherwise, if for example there were no market for small loans. In the latter case, there would be less lending and borrowing in total. Perhaps the borrower in our example would have been unable to find funds. His real expenditure would not then have taken place, with possible repercussions on the rest of the economy.

We turn now to the second consequence of intermediation and to the question of how intermediaries are able to create liquidity, to 'borrow short and lend long'. A liquid asset is one that can be turned into money quickly, cheaply and for a known monetary value. Thus the achievement of a financial intermediary must be that lenders can recall their loan either (or both) more quickly or with a greater certainty of its capital value than would otherwise be the case. Notice that liquidity has three dimensions: 'time' – the speed with which an asset can be exchanged for money; 'risk' – the possibility that the asset may be realizable for value different from that which is expected; and 'cost' – the pecuniary and other sacrifices that have to be made in carrying out the exchange. At the same time, an intermediary has to offer liabilities to borrowers which are more attractive than direct lending and this almost always means offering loans which are larger and for longer periods than would otherwise be the case. On the face of it, borrowers' and lenders' wants conflict (as we saw in Section 1.2.1). How can they be reconciled and a profit drawn from their reconciliation?

In Figure 1.3, we have suggested that the reconciliation involves four processes: maturity transformation, risk reduction, search and transaction costs and monitoring. We look now at each of these in turn. We shall see that the processes overlap somewhat; nonetheless, thinking in terms of four processes is still helpful.

**Maturity transformation.** Maturity transformation means that intermediaries accept funds of a given maturity, that is, funds which are liable for repayment to lenders at a given date or with a given degree of notice, and 'transform' them into loans of a longer maturity. Any deposit-taking institution will provide a dramatic illustration of this process. This is because they accept deposits of a very short maturity, some indeed repayable 'at sight' or on demand, and yet they simultaneously make loans which need not be repaid for several years. In the UK, building societies transform deposits into loans for periods up to 25 years.

The funds accepted by institutions appear as liabilities in their balance sheets while the loans into which they are transformed appear, with other items, on the asset side. Table 1.2 shows the consolidated balance sheet of German banks. Notice that liabilities are dominated by deposits, the bulk of which are repayable at notice of less than three months, while assets consist overwhelmingly of loans and advances, most of which will be for periods much longer than three months. These cannot be recalled without breaking the contract with borrowers. In practice, it may also be very difficult to demand repayment even of very short-term loans and overdrafts. Where these have been made to firms, a demand for repayment or a refusal to renew may simply lead to bankruptcy, in which the bank will have to compete with other creditors for repayment from any remaining assets. Notice, however, that while the majority of assets are therefore relatively illiquid, some remaining assets are very liquid. Banks can draw on their deposits at the central bank without notice and can sell bills and other securities for cash quite quickly. We shall see in a moment that retaining a small pool of highly liquid assets is part of the key to maturity transformation.

The ability of financial institutions to engage in maturity transformation depends fundamentally upon *size*. The advantages of scale come in two major forms. Firstly, with large numbers of depositors or other types of lender, intermediaries will have a steady inflow and outflow of funds each day. There will be fluctuations. On some days there will be net inflows and on some

**Table 1.2** German banks' balance sheet (end December 2003)

Assets, € bn			Liabilities, € bn		
		%			%
Cash in hand and balances at central bank	54	0.8	Sight and time deposits	1,719	26.6
Market loans	1,739	27.0	Savings deposits	600	9.3
Bills	24	0.4	Savings bonds	90	1.4
Bonds	1,013	15.6	Bonds and bills	1,496	23.0
Shares	336	5.2	Loan from other financial institutions	1,813	28.0
Advances	3,021	46.6	Capital	252	3.9
Other	284	4.4	Other	501	7.8
Total	6,471	100.0	Total	6,471	100.0

Source: Deutsche Bundesbank, *Banken Statistik*, February 2004, table 1.

days net outflows. The larger the numbers the more stable these net flows will be. There will be variations in the flows in response to external shocks. There may be seasonal variations. There will certainly be variations too in response to other firms' behaviour. If competitors raise interest rates, net inflows will decline. But all these variations become more predictable as the number of lenders increases. The significance of this is that it is only *net* outflows against which intermediaries need to hold liquid assets as reserves. The reason that banks can hold so little cash in relation to all their other assets is that even at their maximum, net outflows on any particular day are extremely small in relation to the total stock of assets and, crucially, banks *know this with virtual certainty*.

Secondly, large size implies a large number of borrowers or a large quantity of funds which can be spread across a wide variety of assets. The larger the volume of assets, be they loans, securities or anything else, the greater the scope for arranging them in such a way that a small fraction is always on the point of maturing. This guarantees a steady stream of liquid assets. At best, assets can be arranged so that they mature so as to coincide with anticipated days of major net outflows. In the limiting case, a perfect match would mean that firms need hold no liquid assets.

**Risk reduction.** Financial intermediaries are able to reduce risk through a number of devices. The two principal ones are diversification and specialist management. The scale of operations is also relevant here. As a general rule, the opportunities for risk reduction increase with size.

It seems intuitively obvious that holding just one asset is more likely to produce unexpected outcomes than holding a collection or 'portfolio' of assets. This is the basis on which small savers are recommended to contribute to a managed fund, or to buy unit trusts. The managers of the funds can collect contributions from a large number of small savers and then distribute a comparatively large sum amongst many more assets than an individual saver could possibly afford to do, bearing in mind transaction costs. Precisely the same process is at work in a deposit-taking institution. The intermediary accepts a large number of small deposits, creates a large pool and then distributes that pool between a number of borrowers who, the intermediary can ensure, are borrowing to fund different, that is, diverse, types of activity. (The pool also enables the intermediary to adjust the size of loan to the needs of borrowers which will usually be much larger than the size of the average deposit.) Clearly, the larger the size of the institution the larger its pool of funds. Since the cost of setting up a loan, or buying securities, is more or less constant regardless of size, large loans and large security purchases have lower unit transaction costs than small ones. A large institution has the advantage therefore that it can diversify widely and cheaply even though it deals in large investments.

Precisely how and why diversification leads to a reduction in risk is a complex, technical question. For the moment, we can probably agree that the reason that common sense encourages us to diversify has something to do with the fact that assets do not all behave in the same way at the same time and that,

**Box 1.2 The gains from diversification**

Imagine an investor faced with the opportunity to invest in either or both of two shares, *A* and *B*, the returns on which behave independently. Suppose that both are expected to yield a return of 20 per cent in 'good' times and 10 per cent in 'bad' times. Assume, furthermore, that there is a 50 per cent probability of each share striking good and bad conditions.

Then it follows that investing wholly in *A* or wholly in *B* produces the expected return:

$$\hat{K} = 0.5(20\%) + 0.5(10\%) = 15\%$$

Notice that although the expected return averaged over a period of time will be 15 per cent per year, in any one year there will a 50 per cent chance of getting a high return and a 50 per cent chance of getting a low return. There is absolutely no chance whatsoever of getting the expected return! Risk, in the sense in which we have been using it, is infinite. Remember that this conclusion applies whether we hold *A* or *B*.

Now consider the possible outcomes if one half of the investor's funds are allocated to each of *A* and *B*. Since good and bad conditions can arise *independently* for each of *A* and *B*, it follows that four outcomes are possible, each of course with an equal probability of 25 per cent. The outcomes and the associated returns are:

Outcome	A	B	Return
1	Good	Good	20%
2	Good	Bad	15%
3	Bad	Good	15%
4	Bad	Bad	10%

Over the years the expected return will be:

$$\hat{K} = 0.25(20\%) + 0.25(15\%) + 0.25(15\%) + 0.25(10\%) = 15\%$$

The expected return is still 15 per cent, but in any one year receiving the expected return is now the most likely outcome!

therefore, if we hold enough different assets there will be occasions when the behaviour of some tends to offset the behaviour of others. The key certainly does lie in the fact that there is less than perfect correlation between movements in asset returns. What is harder to understand is that by combining assets in a portfolio, one can actually reduce the risk of the portfolio below the average of the individual risk of the assets contained within it. Box 1.2 gives an extreme illustration of how 'diversifying' from just one to two assets reduces portfolio risk below the average for the two individual assets.

In addition to being able to reduce investors' risk by diversification, intermediaries also offer the risk reducing benefit of specialist expertise. It is extremely difficult and costly for individuals to research the status of would-be borrowers and their schemes. There are newspapers and magazines which claim to offer useful information about companies and their plans and sometimes they go so far as to offer 'tips' to would-be investors, but the quality of this information is much less than that which can be obtained by intermediaries recruiting and training 'analysts' who specialize in assessing the risk and likely performance of particular groups of potential borrowers. And here again, scale is important. As more information and experience is acquired it becomes easier to spot the

essential characteristics of borrowers and their projects which make them into low, medium or high risks with high, medium or low potential returns.

**Search and transaction costs.** At one extreme, one can imagine the costs, pecuniary and otherwise, of direct lending where an individual lender has to search for, contact and arrange for an individually negotiated, legally binding contract to be drawn up. More realistically, one can also imagine the costs faced by small savers trying to diversify their wealth across a range of securities. On each of these a minimum commission has to be paid and, being fixed, this therefore rises as a proportion of the value of the transaction as the transaction gets smaller. Looking at it another way, savers with small funds have to earn a bigger gross return to offset their higher transaction costs. A saver with less than £50,000 to invest and looking for diversification across a minimum of, say, 15 securities is likely to find the charges made by unit trusts and managed funds (typically 5 per cent of the initial investment and 1 per cent annual management charge) attractive. The lower costs available through an intermediary result, of course, from the ability to pool funds and to trade in large blocks of securities where the dealing commission is very small as a proportion of the value.

The same process is at work with deposit-taking institutions. One standard contract covers each class of deposit and each type of loan. The intermediaries' search costs are incorporated in the cost of prime site premises and in their advertising. The consequence of such spending is that lenders and borrowers know what services are available and where. Although prime sites and advertising are very expensive, once again the scale of operations almost certainly means that these search costs, absorbed by intermediaries, are less than the search costs that would be incurred by lenders and borrowers if they had to deal with each other directly.

We said at the beginning of this section that financial intermediaries clearly offered some benefit to borrowers and lenders since the latter were prepared to deal via the intermediary on terms which allowed the intermediary to make a profit (from a mixture of fees and the 'spread' between rates charged to borrowers and paid to lenders). Having seen what it is that intermediaries do (and how they do it) we are now in a position to see formally how benefits arise and why they are worth paying for.

We denote a lender by  $L$  and a borrower by  $B$  and we suppose that they have agreed to lend/borrow at a rate of interest,  $i$ , in the absence of an intermediary. Without an intermediary, however, both will be involved in search and transaction costs and these will eat into the return that the lender gets and will add to the costs for the borrower. If we denote the costs to the lender and borrower respectively as  $C_L$  and  $C_B$  and imagine that they are expressed as a percentage of the agreed loan then the *net* return to the lender,  $i_L$ , will be:

$$i - C_L = i_L \quad (1.2)$$

and the *gross* cost to the borrower,  $i_B$  will be:

$$i + C_B = i_B \quad (1.3)$$

Consequently, the difference between the actual cost to the borrower and the actual return to the lender, that is, having regard to their respective costs, is  $(i_B - i_L)$  and is the sum of their combined search and transaction costs:

$$C_B + C_L \quad (1.4)$$

Our argument in the last few paragraphs of course has been that financial intermediaries can reduce search and transaction costs. Let us then suppose that by dealing via an intermediary the costs for our borrower

and lender would have been  $C'_B$  and  $C'_L$  respectively, where:

$$C'_B < C_B \text{ and } C'_L < C_L \quad (1.5)$$

However, in order to supply the services that enable these cost reductions to take place, the intermediary makes a charge,  $\Psi$ . This is assumed again to be expressed as a percentage of the loan. Indeed, it could take the form of charging a higher explicit interest rate to the borrower and paying a lower explicit rate to the lender. Clearly, in these circumstances there is an opportunity for profitable intermediation to be beneficial to both borrowers and lenders provided that:

$$(\Psi + C'_B + C'_L) < C_B + C_L \quad (1.6)$$

Notice that the possibilities for profitable intermediation in (1.6) hinge solely upon intermediaries being able to reduce costs for lenders and borrowers cheaply. That is to say that the reduction in costs must be greater than the charge made by the intermediary:

$$(C_B + C_L) - (C'_B + C'_L) > \Psi \quad (1.7)$$

We can see from our discussion above that this is a condition that should be widely met. We have tried throughout this section to argue that the costs faced by lenders and borrowers dealing directly are very considerable and that the savings available via intermediaries are substantial.

This illustration shows nothing of the other advantages of intermediation, those that arise from maturity transformation and risk reduction, for example. To incorporate these, we have to return to the agreed rate of interest,  $i$ . This, it will be recalled, was agreed between borrowers and lenders in the absence of an intermediary which was later introduced in order to reduce transaction and search costs, *ceteris paribus*. In practice, of course, we would expect the presence of intermediaries not just to reduce these costs but also to make lending and borrowing much more attractive in many respects. We could accommodate this in our illustration by allowing the agreed rate of interest,  $i$ , in (1.2) and (1.3) to tumble at the same time that costs were being reduced, in (1.5). This would not alter our illustration of profitable intermediation. It would simply mean that the agreed rate of interest assumed for the illustration would be much lower once intermediaries were introduced. The benefits from the cost-reducing aspects of intermediation would still depend upon the condition in (1.7), whatever the level of interest rates.

**Box 1.3 Financial intermediaries and transaction costs**

Looking at Equations 1.2–1.7, we can illustrate financial intermediaries' ability to reduce costs to borrowers and lenders while at the same time making a charge for their services which yields them a profit.

Suppose that  $B$  agrees to borrow £10,000 from  $L$  for one year at 20 per cent interest. (So,  $i = 0.2$ ). Imagine now that  $L$  reckons that drawing up a contract and checking on  $B$ 's creditworthiness is going to cost him £500. Similarly,  $B$  calculates that he has spent £100 on advertising for a lender.

As a result,  $L$  calculates his *net* return as  $£2,000 - £500 = £1,500$  ( $i_L = 0.15$ ), while  $B$  calculates his *gross* cost as  $£2,000 + £100 = £2,100$  ( $i_B = 0.21$ )

The difference between the actual return and the actual cost is then  $£2,100 - £1,500 = £600$ , which is also the sum of their combined transaction and search costs ( $£500 + £100$ ).

Suppose now that both parties are confronted by the possibility of using an intermediary which reckons its search costs at £30 and its transaction costs at £70 for a loan of this kind. On these costs it charges a 30 per cent mark-up for overheads and profit. Ignoring interest, the total cost of using an intermediary compared with direct lending, will be:

$(£30 + £70 + £30)$  against  $(£500 + £100)$

The difference is £470, a considerable saving. Notice that this saving comes about as the result of the difference between the costs of the private transaction (£600) and the costs of the intermediated transaction (£100) *minus* the charge made for the intermediation (£30). As we say in the text, provided the difference between the two levels of cost exceeds the intermediary's charge, then  $B$  and  $L$  will gain from using the intermediary.

Clearly, then, it is not difficult to see why borrowers and lenders may be willing to pay an intermediary for something which they could do themselves. An intermediary may just have lower total costs. But now consider whether there might be further advantages in the form of a lower rate of interest. The 20 per cent was agreed between the borrower and lender, having regard to the level of risk, the maturity preferences of the two parties, alternative possibilities, etc. An intermediary, with all its resources for risk assessment, screening, etc., may well think that 12 per cent is a reasonable rate to charge, while the lender, being able to lend to the bank at zero risk, with the option to retrieve the funds at a moment's notice, may well feel that 7 per cent is an acceptable return.

**Monitoring.** It is generally recognized that financial decisions between two parties are often characterized by asymmetric information. In particular, borrowers are likely to be much better informed about the uses to which they propose to put the funds than lenders can be. This asymmetry is another of the many disincentives to direct lending: the ultimate borrower knows how he is going to use the funds and can form a reasonable judgement of the likelihood of success and the likely rate of return on the project. The borrower may choose to share that information honestly and openly with the ultimate lender or may prefer to conceal it. But there is very little that the ultimate lender can do to check the accuracy of the information.

This asymmetry can often be alleviated by financial markets. As we shall see in Chapters 16 and 17, access to bond and equity markets usually requires that borrowers make specified information publicly available on a regular basis and there are severe penalties for firms that fail to do so or who produce information that seeks to mislead. Given that this information

is available from all borrowers to all market participants, 'the market' can use its experience to develop its own 'rating' system, classifying certain types of firms and certain types of projects as more risky than others and pricing the loans accordingly.

However, market solutions to the asymmetry are not always available. Firstly, access to securities markets is expensive. The very requirements that make the information available impose costs on firms, and small firms in particular will not feel it worthwhile to meet the administrative costs of a stock exchange listing. Furthermore, the issue costs associated with raising new funds by selling new shares, for example, are considerable and contain a large fixed cost element. Again, small to medium size firms will not find new security issues cost-efficient for the size of loan they require. Secondly, for persons and unincorporated businesses, markets are simply not appropriate.

The alternative solution is for intermediaries to take on the monitoring task. This involves the development of skills in discriminating between more and less

risky projects and firms. One way in which this is done, of course, is to demand information as a condition of the loan; another is to develop a long-term association with successful clients so as to gain access to ‘inside’ information; yet another is to monitor carefully the *ex post* outcome of projects in which they have invested depositors’ funds. These activities have a high fixed set-up cost but are subject to economies of scale with the result that while individuals are excluded from doing their own monitoring, the cost to each depositor when the service is provided by the bank is quite small.

Notwithstanding the various monitoring mechanisms available to banks, some degree of asymmetry is likely to remain. Banks can and do find themselves exposed to bad risk loans. The imperfect nature of the monitoring process gives rise to the conventional bank-type loan where the borrower is required to provide collateral for the loan and where the terms of the loan sometimes give the bank the power to make the borrower bankrupt.

## 1.4 Financial markets

In economics a market is any organizational device which brings together buyers and sellers. It does not need to be a physical location – though many towns and cities have ‘market squares’ and many of those host periodic markets. Some financial markets exist in specific locations but most use electronic trading methods which allow dealers to be dispersed. For example, markets for foreign exchange by necessity ‘bring together’ buyers and sellers located in countries all over the world. The latest communication technology now permits financial institutions in the United States to deal in shares in Tokyo as readily as they can in New York. Until 1986, share dealing in the UK was concentrated on the trading floor of the London Stock Exchange. With the introduction of new technology, however, dealers quickly dispersed to their companies’ offices.

### 1.4.1 Types of product

What is it that is traded in financial markets? The answer clearly is some sort of financial asset or liability. But briefer terms like ‘financial instruments’ or ‘financial claims’ are sometimes used.

**Table 1.3** A sample of financial instruments

Bank deposits	Bond futures
Certificates of deposit	Currency futures
Treasury bills	Bond options
Central government bonds	Currency options
Local government bonds	Life assurance
Eurocurrencies	Pensions
Equities	Currency swaps

Financial instruments come in a bewildering range of types. Table 1.3 lists just a small sample of instruments traded in financial markets. This is a very small sample from the range of financial instruments for which markets exist. Nonetheless, it is sufficient for us to discuss and illustrate different systems of market classification and thus to draw attention to similarities and differences between the markets for certain types of instrument.

First of all, one can distinguish between those markets for instruments that can be traded directly between holders and potential holders and those that cannot. Markets for equities, bills and bonds are obvious examples of the former. However, we still talk of markets for pensions or life assurance and even, for that matter, of markets for bank deposits. Such instruments cannot be traded directly between third parties. Holders of unwanted pension or life assurance benefits can dispose of them only by ‘selling them back’ to the issuers in exchange for money. The same is the case with bank or savings deposits. Nonetheless, for all these products there is a demand and there is a supply, and the terms on which the demand is satisfied will reflect supply and demand conditions.

Alternatively, one can distinguish markets for instruments that pay a fixed rate of interest from those for instruments where the rate of interest (or the rate of return) is variable. Government bonds probably provide the largest class of fixed interest assets. Most local government bonds and treasury bills are also fixed rate instruments. In France, Italy, Spain and Germany many housing mortgages carry a fixed rate of interest. In the UK, by contrast, most carry a variable rate. As a general rule, bank deposits pay variable interest (though occasionally time deposits pay a fixed rate), while equities, or company shares, pay dividends which are highly variable.

Another popular basis for distinguishing between markets is the *residual maturity* of the instruments traded in them. Some instruments – treasury and commercial bills, interbank loans, certificates of deposit – have a very short maturity when initially issued, generally less than three months, and thus have on average a much shorter residual maturity. Markets for these instruments are often called ‘money markets’ – markets for short-term money. This contrasts with ‘capital markets’ – markets for long-term capital. These include the market for company shares – instruments with a theoretically infinite life. They also include the market for government and corporate bonds which are commonly issued with initial maturities of 10–25 years, and the market for mortgages.

Finally, a distinction is often made between ‘primary’ and ‘secondary’ markets. This does not lead to a distinction based on the trading of different instruments but rather upon subsets of a given instrument. A primary market is a market for a newly issued instrument. (In a primary market an instrument can only be traded once.) The primary market for company shares, for example, consists of firms issuing new shares, the underwriters of the issue and those members of the general public willing to buy new issues. Notice that it is only in the primary market that firms actually raise (borrow) new funds. The corresponding secondary market is the market for existing instruments, in this example, for company shares that were first issued sometime in the past. No new funds are being raised. This does not, however, make secondary markets unimportant. Firstly, the existence of an active secondary market makes new issues more liquid than they would otherwise be. The fact that they can be easily sold on makes them more attractive to buyers and thus new issues can be sold at a higher price (and capital raised at lower cost) than would otherwise be the case. Secondly, new issues have to offer a combination of risk and return comparable with that available on issues being traded in the secondary market. The secondary market, in other words, is determining the cost of new capital. Thirdly, since the trading in secondary markets amounts to trading in claims on existing *real* assets, the secondary market provides a mechanism whereby the ownership and control of organizations can change hands. Many would argue that this is essential if ‘good’ management is to replace ‘bad’.

As financial innovation proceeds, so new instruments emerge, and with them new markets. As a general

rule, new instruments tend to fill the gaps between existing ones, often offering a combination of attractions currently available only in different instruments. This process is said to be taking us towards a ‘complete’ set of markets, a situation which economists tend to regard as desirable since it means that the facilities exist to satisfy the needs of every borrower and lender. As this happens, so it becomes more difficult to draw demarcations between markets, a problem of which regulators are only too well aware.

The behaviour of financial markets, like the behaviour of other markets, can be analysed using the apparatus of conventional economics. In Part 5 of the book we look at a variety of markets in detail.

### 1.5 The financial system and the real economy

We have just seen that the function of a financial system is broadly to facilitate lending and borrowing. This enables people to arrange their expenditure over time in a way which is to some degree independent of their income. Lenders can store wealth for later consumption; borrowers can buy in advance of their income. As well as displacing expenditure through time, this is also displacing the use of resources between people. Lenders temporarily surrender a claim to goods and services while borrowers get the use of those goods and services. When we talk about ‘the real economy’, therefore, we mean that part of the economy which produces the real goods and services to which claims are being made as opposed to the financial part of the economy whose job is to enable the claims to be transferred on attractive terms. Clearly, the efficiency with which the real economy functions is of paramount importance since it ultimately determines the real standard of living. Countries which feel that their real economy is failing to perform as it should (and in rich economies this is usually judged by comparing the rate of growth of output with that of other rich economies) sometimes look to the financial system as one of the possible causes: is it too large, too small, inefficient, ‘short-termist’? In this section, we consider three broad headings under which one can generalize about the relationship between financial activity and the real economy. These are: the composition of aggregate demand, the level of aggregate demand, and the allocation of resources.

### 1.5.1 The composition of aggregate demand

We are familiar now with the idea that one major function of a financial system is to make it easier for agents to borrow and to lend. In Section 1.3.2 we placed great emphasis on the possibility that without the help of intermediaries lenders and borrowers would be unable to negotiate acceptable terms, or at least that the rate of interest would be so high that there would be very little lending and borrowing. If we try now to formalize this a little we can say that one consequence of financial intermediation is that, *at any given rate of interest*, lenders will be more willing to lend and borrowers will be more willing to borrow than they would otherwise be. Much the same can be said about financial markets. Efficient markets with low transaction costs make it easy for holders of securities to buy and sell. Securities become more attractive to lenders than they would be if they had to buy and hold the security until it matured. Consequently firms, and others, can borrow more cheaply by issuing securities at lower rates of interest than would otherwise need to be the case. Figure 1.4a illustrates the effect using a familiar diagram. On the vertical axis, we have the rate of interest,  $i$ , and on the horizontal axis, the *flow* of funds lent and borrowed. The figure shows the supply of funds under conditions of a developed financial system,  $S$ , and the demand for them, again in a system

which offers a range of choice of favourable conditions to borrowers. The flow of funds is shown by  $F^*$  at a rate of interest  $i^*$ . If lenders were not able to lend with security and for short periods, and if borrowers could only find one or two lenders after intensive and costly searching, the supply of funds would be much less, shown by  $S'$ , and the demand for them also much less, shown by  $D'$ . In these circumstances the flow of lending and borrowing would be much less at  $F'$ , and much more costly at  $i'$ .

Figure 1.4b shows the effect upon real investment expenditure. Firms are assumed to undertake all those investment projects which yield an expected rate of return at least equal to the cost of funds (here, the rate of interest in Figure 1.4a). Marginal projects are assumed to have diminishing expected yields. Thus, for a given state of expectations regarding the rates of return on investment projects we say the flow of real investment spending is expected to be negatively related to the cost of funds and we can draw an explicit relationship,  $I$  in Figure 1.4b. Combining two diagrams, we can see that in the more favourable lending–borrowing conditions the cost of funds will be  $i^*$  and the flow of investment will be  $I^*$ . Without the advantages of a developed financial system, the cost of funds would have been  $i'$  and investment spending would be  $I'$  only.

In conclusion, then, we may say that the existence of a developed financial system offering a full range

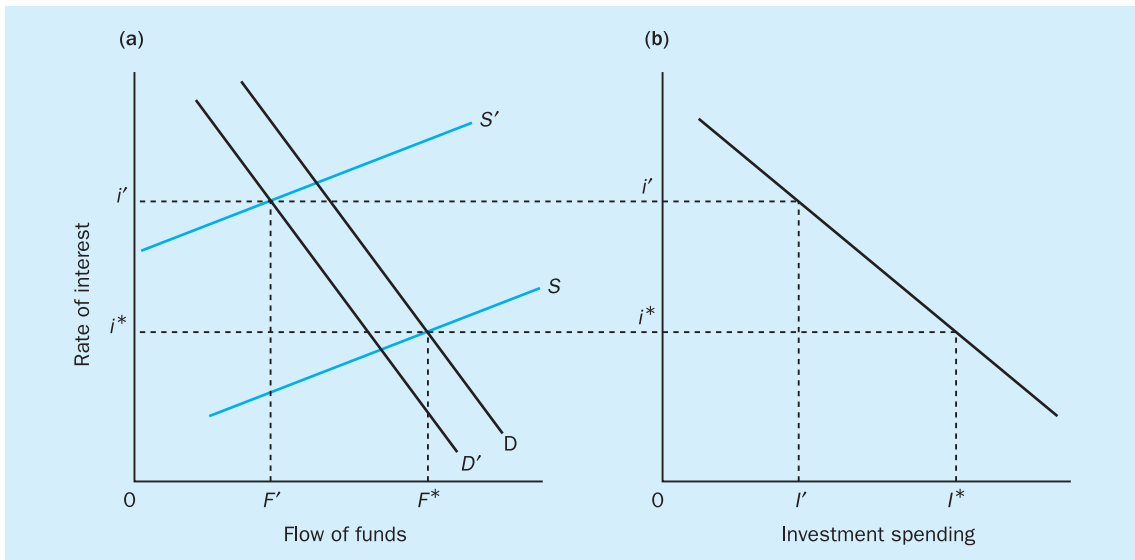


Figure 1.4 Financial intermediation encourages saving and investment



of instruments to match the needs of borrowers and lenders is likely to facilitate higher levels of investment, relative to consumption, spending than would otherwise occur. Indeed, in recent years it has become fashionable to argue that the *underdevelopment* of the financial system (the result of ‘financial repression’) in many poorer economies has led to their poor growth performance.

### 1.5.2 The level of aggregate demand

In addition to affecting the *composition* of aggregate demand, there is the possibility that financial development may affect the *level* of aggregate demand and thus either the level of output, or the level of prices, or both. There are two channels through which such a connection may come about and both can be explored using the ‘equation of exchange’:

$$MV = PT \quad (1.8)$$

where  $M$  stands for the stock of money,  $P$  for the average level of prices and  $T$  for the total volume of transactions in the economy.  $V$  is then a magnitude (usually referred to as *velocity*) which expresses the fact that the total *value* of expenditure,  $P \times T$ , is usually some multiple of the total quantity of money in existence. This, in turn, is possible because the *stock* of money circulates. The same pound, peseta or Deutschmark can be used to make several purchases in the course of a year.

A common variation on Equation 1.8 is to replace  $T$  with  $Y$ , standing for the total volume of output of goods and services, or real GDP.  $PY$  then becomes spending on nominal income, or simply nominal GDP, rather than *total* spending which would include spending on secondhand assets, intermediate goods, and so on.

Suppose now that we put some restrictions on  $V$ . Suppose we say that it is likely to change only slowly and predictably.<sup>3</sup> Clearly, if, for example, we took an extreme position and assumed  $V$  to be *constant*, then any change in  $M$  must be reflected by a change in  $PY$ , that is, in either the general price or the volume of goods and services produced. We shall ignore the complications of the split between the effect on  $P$  and

$Y$  for the time being. We can assume that it depends on how close the economy is to full employment.

For our purposes, what is important is that we have a connection between  $M$  and aggregate demand. In developed economies, money consists overwhelmingly of bank deposits, that is to say that it consists of the liabilities of banks. Clearly, therefore, any development in the financial system which causes an expansion of banks’ balance sheets simultaneously increases the money stock and, *on the assumption that velocity is stable* (it does not have to be fixed), then we should expect an increase in aggregate demand, with whatever consequence may follow from that. This is the first, and perhaps the more obvious, of the two routes through which financial activity may affect the level of demand.

The second channel requires us to focus upon  $V$ . This we said is the ratio of  $PY$  to  $M$  ( $V = PY/M$ ). What it is telling us is how much expenditure is being carried out, measured usually over a year, with a given level of money stock. If we think of this at the personal level, it reflects the total amount of spending that a household does over a year as a multiple of its average holding of money over the year. We said above that this obviously depends, *inter alia*, on how often the household receives its income. (If the chief income earner is paid monthly, a larger average money balance would be held than if s/he were paid weekly.) Conditions like this obviously change very slowly and, as we said above, the assumption has often been made that velocity changes very slowly and infrequently. But think again about our hypothetical family. In deciding on the average money balance to hold, the family obviously has to bear in mind their total expenditure, the timing of that expenditure and any possible variability in the timing of that spending. That is, part of their decision must involve a ‘precautionary’ motive. Consider now the decision they will make if money is the only liquid asset available to them. They have to hold sufficient money at all times not just to meet *planned* expenditure but also any *unplanned* spending in a given period. Contrast this with a situation where many liquid assets exist, assets which are not themselves money (are not acceptable in exchange) but which can be turned quickly and cheaply into money. In these circumstances, a

<sup>3</sup> The traditional argument was that what determined the speed at which money could circulate was determined by ‘institutional factors’ – the intervals at which people were paid, the ease of switching between money and other assets – and that these changed very slowly.

shortage of money caused by the need for unplanned spending is much less serious. Money can be obtained quickly. If these ‘near money’ assets are attractive in themselves – for example, they may pay a better rate of interest – then our household will obviously be tempted to hold lower money balances, taking the risk that it may have occasionally to exchange some savings certificates for money. In these circumstances, then, it is prepared to hold less money in relation to spending. Let us now translate this into the aggregate (‘less money is needed in order to finance the current level of aggregate demand’) and then reverse it. We can now say that the existing money stock can finance a higher level of aggregate demand. *PY* can increase relative to *M* and velocity has increased.

Notice that the second channel does not concentrate upon banks. Any development in financial markets, intermediaries or products which creates attractive substitutes for money as a liquid store of wealth will enable people to economize on holdings of money, allow money to ‘work harder’ and cause velocity to rise. This is the version of the second channel of influence that most economists would recognize. It is just another way of stating the argument that we met earlier in connection with the consequences of intermediation. Intermediaries create liquidity and people’s spending decisions will be influenced by their access to liquidity as well as by having money itself. This is a point of view which was famously advanced in the UK by the Radcliffe Committee in 1959 and would still be adopted by economists of a Keynesian persuasion.

### 1.5.3 The financial system and resource allocation

In a perfect world, the funds that savers are prepared to make available should flow to their socially most beneficial use, and should do so in the cheapest and most efficient way. In principle, one could imagine a system that achieved this. Whether we were dealing with lending via markets or via intermediaries, savers’ funds would need to flow to projects offering the highest returns for a given level of risk. The markets and intermediaries themselves would be subject to perfect competition and operating at minimum average cost. We should then need to be sure that the rate of return on the real capital employed represented society’s valuation of the benefits flowing from its

use. There must be no externalities, for example, and no monopoly returns. For a given level of risk, there would be a uniform rate of return on projects and on the funds used to finance them and this would represent society’s willingness to trade consumption now for consumption in the future. Most importantly, a project offering above average returns would be producing above average benefits. It would also have access to unlimited funds. With no monopoly conditions, such projects could be undertaken in larger numbers (adding more to aggregate benefits) until the returns on the project and on the funds equalled those available on other projects.

Introducing firms into the picture leads us to some other notable conclusions. Since, in theory, a firm is nothing but an administrative device for organizing real capital projects, the returns available to the owners of firms are simply the returns available from its capital projects. So long as the returns on the projects are greater than the returns required by the owners, more funds can be raised and the firm will expand (raising the general level of welfare all the time, remember) until the returns on capital just equal the cost of funds required by the owners. The owners, of course, are the shareholders. Their shares have a market value and if shareholders are happy that the firm’s projects yield just the rate of return that they require, there will be no buying or selling and the share price will be in equilibrium. This is the price at which the firm has to issue new shares if it wishes to expand. The price reflects, again, the cost of funds. If the price were higher, funds would be cheaper; if the price were lower, funds would be dearer.

We have come a long way in a short distance, but what all this amounts to is a summary of the conditions that would have to prevail for us to be sure that funds were always going to those uses that produced the maximum benefit for society. It is not difficult to imagine circumstances in which this happy result will not be achieved.

Firstly, there are conditions relating to the operation of firms. The production of real goods and services is sometimes associated with negative externalities which means that the price people pay overestimates the real gain to society. Such goods and services are overproduced. Some industries are monopolistic. Their projects earn above average returns and it is not possible for such returns to be eliminated by additional production. Such goods and services are underproduced from a social point of view.

But there are in practice some defects in the operation of most financial systems as well. Financial activity is often **segmented**. That is to say that funds flow from particular sources to particular destinations. They are not free to flow to the most socially productive use. The reasons for this are sometimes informal or historical – households with surplus funds think first of accumulating interest-bearing deposits because securities have been seen as assets for the rich. Sometimes there are legal reasons – institutions that take small savings are obliged to channel a large proportion into government debt because it is seen as ‘safe’. Sometimes the reasons are institutional – the minimum denominations of treasury and commercial bills are far too large for private savers, or minimum commissions are too large. The desire to break down such segmentation, and the argument behind it that this would make the system more efficient, has been a major driving force in policies of financial deregulation in recent years.

Another reason why an optimum allocation of funds may not occur lies in either the poverty or asymmetry of information. Acquiring information about the best returns available takes time and thus has a cost attached to it. Many people will think such costs not worth incurring. For many years, most European governments have been able to borrow from households more cheaply than from any other source and this may be as much the result of households’ reluctance to search for better returns as it is the result of a desire for high security. This gives, in effect, a subsidy to public sector borrowing and investment.

Part of the return for holding some assets comes as a result of an appreciation of the asset’s value – a capital gain. Clearly, such gains are expected as a ‘natural’ result of holding company shares over a long period and may be as important to investors as the periodic dividend payments. Provided the price goes up, investors make a gain. We may know that the market price should only reflect the productivity of the underlying assets but investors would be foolish, acting against their own self-interest, if they failed to buy (or to hold) shares whose prices they were sure would rise. Profitable investment is not only, therefore, a question of buying shares of firms that are about to enjoy large profits; it is about buying the shares of firms that other people *think* are going to enjoy good times. You may even get rich by buying shares in firms that other people think are about to

do well. Indeed, maybe the firm’s profitability has nothing to do with it at all – you only need to be able to spot those shares that other people are about to buy (for whatever reason). This behaviour gives rise to what are sometimes known as ‘fads’ or speculative bubbles. Asset prices begin to rise, perhaps for good economic reasons. But once people think that the rise is going to continue there will be some who buy just because they believe the price is going to rise, not because they believe there is any fundamental reason why it should. And if enough buyers join in, the price *will* rise. At least, for a while. But we have to remember that while gambling on asset price movements may seem like harmless fun, or at least something that can only harm the gambler, a change in an asset’s price is a change in the cost at which funds can be raised. A rise in the price of shares, for example, makes raising capital cheaper; it encourages expansion; it makes it easier for the firm to take over ownership of its rivals. This is fine if there are sound underlying reasons – the firm may be more productive and better managed than its competitors. But it is a serious failing of the market if it happens for no reason other than a ‘fad’.

We return to ‘fads’ in Section 11.5 while the general question of financial **market efficiency** is one to which we return in Chapter 26.

## 1.6 Summary

The primary function of a financial system is to reconcile the diverging interests of end users, lenders and borrowers. The system itself consists of a group of institutions and markets, both of which help people to lend and to borrow. Financial institutions are often described as ‘intermediaries’ because of their particular ability to create the liquidity that lenders and borrowers want. This ability relies upon the transformation of maturity and risk and the reduction of costs. These processes are facilitated by the size of intermediaries.

The effects of a financial system are to make lending and borrowing cheaper and to increase liquidity. This in turn encourages investment and may also increase the overall level of spending in the economy. The efficiency with which the financial system channels funds from lenders to borrowers is also important for resource allocation.

### Key concepts in this chapter

End users	Borrowing	Portfolio theory
Ultimate borrowers	Risk	Portfolio equilibrium
Deficit units	Return	Intermediation
Surplus units	Real investment	Maturity transformation
Ultimate lenders	Financial surplus	Search costs
Direct lending	Financial deficit	Transaction costs
Organized markets	Liquidity	Monitoring
Saving	Financial stocks	Velocity
Lending	Financial flows	Market segmentation
Hoarding	Portfolio choice	Market efficiency

### Questions and problems

- 1 Distinguish between surplus and deficit units.
- 2 Discuss the advantage to deficit and surplus units of using financial intermediaries and organized markets.
- 3 Suppose you wished to save for your retirement, in an economy with no financial system. What assets would you accumulate and why? What advantages would you have if you were able to contribute to a conventional pension fund?
- 4 With which financial institutions do you deal? Identify those with which you deal as a deficit unit and those with which you deal as a surplus unit. Which of them are deposit-taking institutions? Which of them are not?
- 5 Distinguish between broking and intermediation.
- 6 Why do people hold financial assets and liabilities simultaneously?
- 7 How are financial intermediaries able to engage in maturity transformation?

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[www.bankofengland.co.uk](http://www.bankofengland.co.uk)  
[www.banquedefrance.fr](http://www.banquedefrance.fr)



Part 2

# Financial Institutions and Systems



Chapter 2

# An introduction to financial systems

Murray Glickman

*What you will learn in this chapter:*

- How financial systems differ
- The different roles played by deposit and non-deposit intermediaries
- The different risks faced by DTIs and non-DTIs
- How DTIs and non-DTIs deal with these risks
- How the different roles and different risks affect the structure of their balance sheets



## 2.1 Introduction

At the beginning of this book, we defined a financial system as consisting of a set of financial markets and institutions and the people who use them – the ultimate lenders and borrowers. Under global pressures, the free movement of capital is an obvious example, national financial systems are coming to look more and more alike. However, it is not yet quite true that all financial *systems* are the same. The differences lie mainly in the institutions and in approaches to the regulation of financial activity.

By contrast, financial markets and the instruments traded in those markets are remarkably similar from one country to another. The instruments – bills, bonds, equities and so on – fulfil a common purpose wherever they are traded and inevitably, therefore, they are priced according to the same principles in all countries. Indeed, most of the instruments are internationally traded with the result, for example, that US equities are close substitutes for German equities in the portfolio of a French investor. The few differences that exist between *markets* in different countries amount to differences in size and differences in institutional arrangements for the trading of instruments. These differences are neither large nor very important, but we have picked out the main details in each of the market chapters in Part 5 of this book.

In this part of the book we concentrate upon the institutions which make up the financial systems of Germany, France, UK, Scandinavia, USA and Italy. To begin with, though, we look at different ways of classifying financial systems, an issue that has become complicated in recent years, and then we provide a summary of different types of financial institutions, their functions and the principles which underlie their activities.

## 2.2 Classification of financial systems

In the existing literature, financial systems are widely interpreted as lying somewhere along a continuum with ‘**market-based**’ systems at one end and ‘**bank-based**’ systems at the other. However, the position on this continuum tends to be associated with other, important, characteristics so an effective classification system requires additional dimensions. For example, if financial markets play a large part in corporate financing and those markets are particularly active, then takeovers, often hostile, will likely be commonplace in disciplining firms (and managements) which underachieve. It has even been argued that market-based systems tend to encourage a degree of ‘short-termism’ in the decisions of managers who are conscious of the need continuously to maximize shareholder returns. There are implications in other words, for corporate governance. Conversely, if markets play a small role, firms will be more dependent upon banks for finance. Banks will therefore have to take a close interest in firm behaviour, suggesting an alternative form of corporate discipline, and they may have to be structured differently from banks which operate in a ‘market-based’ system. So, if we wish to classify financial systems in this way, we need to think not just about the role of markets but also about the nature of the banking system and the style of corporate governance. Table 2.1 is adapted from Allen and Gale (2000) and shows the relative standing of the major financial nations with respect to the dimensions we have just discussed.

We turn our attention now to each of these three dimensions, but before we do so it is worth noting that each is defined by its role in the process of corporate financing. This reflects a particular model of financial activity which sees its fundamental role as channeling surplus funds from households to firms wishing

**Table 2.1** Classifying financial systems

	USA	UK	Japan	France	Germany
Markets	Very important	Very important	Important	Fairly unimportant	Unimportant
Banks	Competitive	Concentrated	Concentrated	Concentrated	Concentrated
External corporate discipline	Takeovers	Takeovers	Banks	Banks/takeovers	‘Hausbanken’

to invest. We have already seen that financial systems do a good deal more than this and, at the end of this section, we shall see that even if one focuses solely on the ‘channelling of funds’ function it is by no means obvious that the household → firm route is the only, or even main, one that financial systems are concerned with today. Nonetheless, where characterizing systems is concerned, the criteria are dominated by the corporate financing process.

The original idea that financial systems could be placed along a ‘bank-based/market-based’ continuum was based upon the quantitative importance of sources of funds. In practice, what this means is that banks provide a markedly larger share of corporate funds in bank-based systems than do markets. But we need to be careful not to exaggerate the role of banks and markets in each system. In the bank-based systems (France, Germany and Japan) banks provide typically something approaching 20 per cent of net corporate financing, while markets provide only 3–4 per cent. In the so-called market-based systems (UK and USA) it is true that banks provide very little financing (virtually no long-term financing) but at the same time the issue of new equity and bonds accounts for only 10–15 per cent, while banks provide virtually nothing. In neither system does external finance, bank and market-based combined, contribute more than 20 per cent of the total. The fact is that the bulk of corporate finance comes from internally generated funds, in all systems.

When it comes to the nature of banking systems, different countries have very different histories. In the USA the banking system is characterized by a large number of independent, competitive banks. This stems partly from a deep-seated, historical, dislike of the centralization of economic power (particularly if this meant its concentration in a few northeastern states). Regulations therefore restricted banks to operating within their home state and prevented the development of a nationwide system of branch banking. In 1933 the Glass–Steagall Act prevented banks from helping firms to make new issues of securities (a legacy ultimately of the 1929 Wall Street crash). Although these restrictions were progressively lifted (in the 1980s) their effect has been to limit banking activity to short-term lending to firms and to consumer credit and home loans.

By contrast, banking in the other main countries is highly centralized. In the UK it is dominated by the big four: Barclays, Lloyds-TSB, RBS-NatWest and HSBC. In Germany it is dominated by the big three. In

Japan and France the situation is similar. Even so, there are differences. In Germany and France there is a large mutual/cooperative banking sector which had its origins in providing (cheap) credit for particular trades and activities. In France, the dominant commercial banks have often been owned by the state, although since 1982 they have been privatized. In Germany, the major banks are ‘universal’ banks – providing a full range of financial services to firms and households. In the UK and in France, the tradition was one of specialization (hence the terms ‘retail banks’ contrasting with ‘wholesale’ or ‘investment’ banks) but these too are moving in the German direction.

When it comes to distinguishing between ‘market-based’ and ‘bank-based’ financial systems, it may well be that the main distinction lies in the implications for corporate governance rather than in crude measures of the proportions of funds raised. In all five of the countries we have so far mentioned (and in most others) the boards of directors of large corporations are legally responsible to shareholders for their conduct of the firm. However, it is only in the UK and USA that boards of directors accept that the maximizing of shareholder value is the main day-to-day objective. At the other extreme, Japanese companies have traditionally tried to maintain stable conditions of employment for their employees and this has been accepted by shareholders, at least until recently. There is now pressure for change, being exercised ironically through the financial markets. In between these two extremes, the situation in Germany is much more complex in practice than the legal supremacy of shareholders would suggest. In Germany a system of ‘co-determination’ means that workers are represented on the supervisory boards of companies and therefore have some stake in managements’ decisions. In France, the situation is similar though there workers’ representatives have only rights of consultation. In all three bank-based systems, complex patterns of shareholdings exist between firms and holding companies and cross-holdings are commonplace. Furthermore, in Germany and Japan it is commonplace for a firm to have a long-term relationship with one major bank (the ‘Hausbank’ in Germany) which provides long-term loans to the firm as well as corporate advice. The bank may also be a major shareholder in the firm. In Germany, the majority shareholding in many large firms still remains in the hands of the founding family and its descendants. For all these reasons, takeovers, especially hostile takeovers, while legally possible in bank-based systems, are extremely

rare. External pressure on managements comes, therefore, primarily from banks. The magnitude of this difference, seen from the point of view of a major German bank, and the strength of feeling against the USA/UK system, can be seen in the following observation:

If today you restrict or forbid stakeholding for German banks, the Federal Republic will become a sports arena for foreign banks, then you have Jimmy Goldsmith and other people here, and they will demonstrate to you how to buy, sell and strip industrial stakes in a market economy on the American model. (Siepp [Chairman of Commerz Bank], quoted in Story, 1995)

The relative importance of banks and markets has other implications, which will occasionally emerge in the following chapters. If firms are less reliant on equity capital and if such capital as there is is held largely by banks and founding families, then it follows that equities must form a relatively small part of the savings of the vast majority of households. Typically, households will hold a higher proportion of their wealth in fixed-interest securities or in deposits. Furthermore, there may be implications for the funding of pensions. If equity markets are smaller, then pension funds may also be driven to hold a higher proportion of fixed-interest securities, the income from which may not deliver adequate incomes to people in retirement. Indeed, it may be that the state has to accept a larger role in pension provision in bank-based systems. If the population structure is ageing (generally the case in Europe) this then raises questions about the acceptable level of taxation and the effects on incentives.

Finally, before we leave the question of how we should characterize financial systems, recall once more that the characteristics we have focused on all relate to the way in which a financial system meets the requirements of corporate finance. This, we said, is based upon a model in which households save in order to lend to firms which invest. This is a model with a long history and no doubt was an appropriate description of the role of a financial system for many years. However, it is a feature of all developed financial systems in recent years that more and more activity, particularly lending activity, has been devoted to meeting the needs of the personal or household sector. In the UK, as we shall see later, households borrow more from banks than do industrial and commercial companies and non-bank financial firms combined. Even if there remains

net lending from households to firms, it may be small because firms rely so heavily upon retained funds. This intersectoral lending may then easily be dwarfed by lending between deficit and surplus units within the same sector. Households lending to households may be much more important.

### 2.3 Banks and other deposit-taking institutions

Banks and other deposit-taking institutions are financial intermediaries whose assets consist overwhelmingly of loans to a wide variety of borrowers and whose liabilities consist overwhelmingly of deposits. We shall refer to such institutions henceforth as DTIs for short. The deposits of many such institutions are included in national definitions of the money supply and this inevitably means that many DTIs are involved in the payments mechanism. The European Central Bank has a convenient label for this subset of DTIs. It calls them MFIs or ‘monetary financial institutions’. For reasons we come to later, DTIs offer an increasing range of financial services in addition to lending, deposit-holding and payments.

In spite of these common themes, there remains room for differentiation. Major banks in France, Germany and Japan offer a comprehensive range of financial services to a comprehensive range of clients – households and firms. These include **retail** or **commercial banking**. This is the traditional banking business of holding deposits, bundling them together as loans, operating the payments mechanism etc. **Corporate banking** provides similar services, albeit restricted to large firms. Corporate banks also offer a range of advice and consultancy services of particular relevance to the finance and operation of large firms. *Investment* banking is similar to corporate banking, in that clients are firms rather than households, but here the emphasis is upon the flotation and underwriting of new securities issues. Investment banks also act as intermediaries between publicly quoted firms and their stockholders. In addition, investment banks may also be involved in making markets for company securities (see Chapter 17) and here their activities shade into those of **asset management**. Asset management has least contact with the traditional banking business of deposit-taking and loan-making. It involves primarily the administration of pension

funds, institutional assets and mutual funds, sometimes combined with market-making. In Germany, Japan and France, it is commonplace for a single banking company to be involved in all these activities, though for organizational purposes they may be allocated to separate 'divisions' of the firm. This reflects a tradition of **'universal' banking**, one firm offering all types of banking service, in these countries.

Banks in the UK have made much progress along a similar road (see Figure 3.1). Banks in the USA are more numerous, geographically restricted and are still to some degree restricted in the services they can offer, though like banks in the UK, the trend is toward universal banking. The degree of progress can be represented by the degree of autonomy between the corporate divisions. Banks that wish to act as market-makers in securities in the USA can do so, but only by setting up separately capitalized subsidiaries, and elaborate 'firewalls' are required between different branches of a bank's activities. Alongside the major banks, most countries have a range of smaller DTIs whose sources and uses of funds are restricted by law or, increasingly, only by custom and choice. These include the UK building societies and the US savings and loan societies (S&Ls or 'thrifts'). In France and Germany there are large mutual and cooperative banking sectors with institutions that are limited to particular geographical areas or to providing services for particular groups or professions. The French *Crédit Agricole* is a classic example of a bank which began in this way.

Unfortunately for students of money and banking, the full range of 'banking' services we have just described represent quite different types of activity. Corporate banking is clearly related to retail banking, distinguished by the differing needs of firms and households, but investment banking and asset management have little to do with deposit-taking or the payments mechanism. When talking about 'banks', therefore, it is often important to distinguish between banks whose clients are mainly persons, households and small firms ('retail' banks) and those which offer specialized services to large firms. The question is, what level of differentiation serves best? In the next few chapters we have chosen generally to distinguish between retail banks (offering services mainly to households and small firms) and 'the rest' which offer a range of specialist services largely to firms. We refer to these as **'wholesale'** banks, but it should be remembered that this term embraces activities ranging

from deposit-taking and lending to firms through to asset management. When it matters, we make the distinction again.

We turn now to the traditional business of banking, in which all banks (except the asset managers) are active to some degree. This is usually described as bundling together a large number of small, short-term deposits in order to create a smaller number of larger loans, of longer maturity. This description needs to be viewed carefully. It is perfectly true that if we look at the balance sheet of any bank we shall see that deposits which can be withdrawn at short notice dominate the liability side, while loans (or 'advances') with a longer maturity dominate the asset side. It is also true that there are many more deposits than loans. There certainly is a mismatch of maturity and size and so banks are engaged in both maturity and size transformation. However, the description must not be read as implying causality. It is not the case that banks *receive* large numbers of small short-term deposits which they then *convert* into loans of a different scale and maturity. Deposits do not cause loans. A moment's reflection makes this perfectly clear. When banks respond to a demand from clients it is a demand for loans to which they respond. Customers simply do not go into a bank 'demanding' deposits. An individual customer can add to his or her deposit by paying in cash, but that cash must have been received from someone else who drew cash *from* his or her deposit. Equally, a customer may find his or her deposit increased because s/he has been paid by his or her employer, but that payment is a transfer of a deposit from another bank account. Cash comes into the hands of the public by being obtained from a bank. It is just not true that there is a vast pool of unwanted cash outside banks as a whole waiting to be paid in, in order to increase deposits.

By contrast, clients certainly do ask for loans, and banks, being commercial organizations, do what they can to accommodate all credit-worthy demands. Consider now what happens when a successful applicant makes use of the loan. S/he can do so only by making payment to someone else. The likelihood is that the single loan will be used to finance a series of smaller payments. Throughout the system a number of payees receive an addition to their deposits. Hence the appearance of the balance sheet: many small short-term deposits matching fewer, larger long-term loans. But deposits do not cause the loans, rather loans create deposits.

A major difference between retail and wholesale banks, as we implied above, is that making loans and holding deposits forms a larger part of retail bank business than it does for wholesale banks. Further differences of detail arising from loan/deposit activity are fourfold. Firstly, deposits are particularly small and numerous for retail banks. Secondly, retail clients have insisted upon access to banking services via extensive branch networks; these are expensive and banks are trying to change this behaviour. Thirdly, a high proportion of retail deposits are sight deposits, used for payment and therefore retail banks are central to the payments system. Fourthly, retail bank deposits are mainly in the domestic currency while the majority of deposits for wholesale banks are often held in foreign currency.

Given the presence of sight deposits amongst their liabilities, it follows that banks are engaged in a high degree of maturity transformation. Even if we include all time deposits in the denominator, the average maturity of assets is much longer than liabilities. This is particularly true for retail banks, but it is true only in lesser degree also for wholesale banks. The risks faced by banks are of three broad types. The first, ‘**asset risk**’, is a potential problem for all financial intermediaries; the same is true of the second, ‘**liquidity risk**’, though the deposit nature of bank liabilities means that banks are particularly exposed; the third, ‘**payment risk**’, is almost unique to banks. We look at each in turn and at the action(s) which banks may take to protect themselves. We conclude with some remarks about the regulation of banking activity.

**Asset risk.** As the term suggests, asset risk refers to the statistical probability that the market value of assets may at some point differ from the value recorded in a bank’s balance sheet. Problems arise, naturally enough, when the market value falls below book value. Sudden changes in value can be caused by a wide variety of events. For example, borrowers may default – either on payment of interest or even on the repayment of the loan. Interest rates may rise, causing a fall in the present value of all assets. Occasionally, banks may be forced to sell assets in order to meet demands for withdrawal by their depositors. If this happens on a significant scale across the system, then the sudden excess supply of certain types of asset will force down the price and banks go ‘bankrupt’.

### More from the web What banks do

Banks today are amongst the largest financial institutions in Europe, with branches and subsidiaries throughout the world. Furthermore, they offer a range of services which goes well beyond the traditional banking functions of making loans and holding deposits. Most have websites where the structure and history of the bank can be seen, together with a list of its products and services. Try the three examples below:

[www.Commerzbank.com](http://www.Commerzbank.com)

Commerzbank is one of the big three German universal banks.

[www.creditagricole.fr/legroupe/uk](http://www.creditagricole.fr/legroupe/uk)

This is one of France’s largest banks.

In both cases click on ‘The Group’ to see the structure of the bank and the range of products and services, and on ‘History’ to see how they have come to their dominant position after starting out as lenders and deposit-holders.

Commerzbank and Crédit Agricole are both ‘universal’ banks offering a full range of banking services. Goldman Sachs, by contrast, is an international investment bank. To see the range of services offered by an investment bank, go to [www.goldmansachs.com](http://www.goldmansachs.com) and click on ‘Client Services’. How much reference do you see to deposit-taking and lending? On what you see of Goldman Sachs, what are the main activities of an investment bank?

Protection against asset risk comes broadly in three forms. Firstly, banks are naturally protected to some degree against default by the diversification of their loans across a wide range of borrowers. This is one reason why stability tends to increase with size. The more clients there are, the easier it is to diversify lending across a wide range of different types of borrower with different types of project. Except in a major economic upheaval, it is unlikely that all borrowers of different kinds will simultaneously be unable to service a debt. More typically, a small number of borrowers may be in difficulty at any time, but these poorly performing loans will be insignificant amongst the majority which are performing normally. (We look at the relationship between risk and diversification in Section 8.3.) But banks can, and do, go further. Secondly, they can screen loan applicants – by asking

for information about the purposes of the loan and by checking the credit record of the potential borrower. If the loan is a large one, it may even pay the bank to monitor the performance of the project which it is financing. This is unlikely to happen frequently in the case of retail banks lending to households, but wholesale banks will typically include some clause about their monitoring rights into contracts for large loans made to large firms. Thirdly, they can protect themselves against interest and forced sale risk by holding short-term assets. This has two advantages. If the pool of short-term assets is carefully arranged, a bank can ensure that it has a continuous stream of assets maturing in the normal way and at normal prices. In the event of a sudden need for funds, it can simply not reinvest. Even if this does not meet the crisis, more assets will be maturing in the very near future and the crisis might be averted until this happens. There is also a technical advantage in holding short-term assets when interest rates are volatile. Short-term assets are less price-sensitive to interest rate changes than are long-term assets. The reasons for this are explained later when we look at the riskiness of fixed interest bonds (in Section 16.4). For the moment, we can simply imagine an asset with only six months to maturity. This period can, at most, include only one interest payment, followed by maturity at a specified price. Whatever happens to interest rates on other assets, that can have little effect on the value of our asset, since interest is a very small part of the payments which the asset will shortly deliver.

**Liquidity risk.** Liquidity risk refers to the possibility that a bank may not have the funds with which to meet the demand for payment when it falls due. Notice that this is not necessarily a question of solvency. Assets may well match liabilities but payment on demand requires *liquid* assets to be available in sufficient quantity. This is a question rather of the *composition* of assets and liabilities and relates obviously to the process of maturity transformation in which all financial intermediaries are to some degree engaged. It is particularly acute for banks, since their liabilities will normally include sight deposits, which must be convertible into notes and coin on demand. Furthermore, it must be possible for clients to instruct their banks to make immediate payments to clients of other banks.

Notice that while we are all exposed to liquidity risk, the degree of exposure and above all the *potential consequences* for banks puts them in a unique position

as a result of the ‘convertibility’ promise that attaches to sight deposits. Households can suffer a liquidity crisis when, for example, a utility bill arrives earlier than expected or is for an amount that is unexpectedly large and it has inadequate funds immediately available with which to pay the bill. But the ‘crisis’ is usually manageable. As a general rule, the household has 14 days in which to raise the necessary funds, which it can do by withdrawing funds from a savings account or selling some assets or borrowing. If this is not long enough, payment can usually be delayed for a further period before the utility company terminates the electricity or gas. The situation is similar for firms: payment can usually be delayed for long enough to allow funds to be raised. Even with non-DTIs, a request for repayment by investors does not usually have to be acted on immediately. A period of notice is usually required. But for banks it is completely different. A request to convert sight deposits to cash *must* be met on demand. Any failure to do so, or even a rumour that the bank might have difficulty in so doing, will be enough to close the bank, *however solvent it may be*. This is because the rumour will result in everyone trying to withdraw cash at once and no bank can meet that demand. As we shall see now, the process of banking depends fundamentally on the inability to meet any demand for cash beyond a small fraction of outstanding sight deposits.

One obvious solution would be to hold liquid assets exactly equal to these demand liabilities (a 100 per cent ‘reserve ratio’). In practice, this would mean holding a matching quantity of notes and coin, or notes and coin combined with deposits at the central bank which banks can exchange for notes and coin instantly. The problem with this solution is that such liquid assets (even including deposits at the central bank) yield no interest. These are non-earning assets and as such act as a tax on banking activity. As a general rule, taxes on the production of any good or service are better avoided since they increase the cost and reduce the quantity of what is produced. Furthermore, in the case of banks there is a question of distortion. If a high reserve requirement is placed upon a bank then it is immediately placed at a competitive disadvantage against other financial intermediaries. Experience has shown that this encourages a cat-and-mouse type game between banks and the authorities where banks try to reconstruct themselves or set up subsidiaries in such a way that they fall just outside the definition of a bank for the purposes of the regulation.

Fortunately, what experience has also shown is that the probability of all sight deposits being withdrawn at a moment's notice in an established banking system is infinitesimal. On any particular day, some deposits will be withdrawn (as cash or transferred to another bank as payment) but by the same token, deposits from other banks will flow in. All that is required is sufficient funds to meet the *net* payments plus a margin for unexpected events. Once again, size helps. The larger the client base, i.e. the greater the *number* of flows, (a) the smaller are the net flows relative to the total stock of deposits and (b) the more predictable the flows. The latter is an example of the **Law of Large Numbers**, which we explore in more detail in Section 2.4.1, and it means that net flows can be calculated with greater accuracy. These mean that banks can, in practice, operate with very small reserve ratios. These can be specified by a central monetary authority ('mandatory' ratios) or they may be left to banks' discretion, normally with a requirement that the central bank be notified of any planned change ('prudential' ratios). In the early years of banking, when banks were small and confidence in the convertibility of deposits into cash was less well established than it is today, it was found necessary for the system to have a 'lender of last resort' – a role assumed by the central bank. This meant that if the system were faced with an unexpected demand for convertibility, banks which had insufficient reserves but were otherwise solvent and well managed, would be guaranteed adequate liquidity by being able to borrow from the central bank. Such a role is rarely required today. Central banks are occasionally required to give leadership in a financial crisis but this is more frequently connected with financial markets than the liquidity of the banking system. Where banks are concerned, the central bank's role has undergone a subtle change. Instead of helping banks in occasional crises, central banks now typically provide liquidity on a day-to-day basis in order to smooth out fluctuations in bank reserves which arise from payments between public and private sectors, and to ensure that banks always have funds available to meet the demand for loans which grows with the level of economic activity. This gives rise to the joke that central banks are now lenders of *first* resort but, more seriously it enables banks to operate with even lower reserve ratios (and a lower 'tax') but it gives the central bank immense power over the banking system from another direction – the setting of short-term interest rates.

Holding sufficient notes and coin and other assets, like deposits at the central bank which are virtually cash assets, is an obvious way of dealing with the liquidity risk that arises from the possibility that holders of sight deposits may demand instant withdrawal. It does not, though, avoid the penalty that these assets do not earn interest. Hence there is always commercial pressure to restrict these to a minimum level (with the help of the central bank these days) and hold assets which may be slightly less liquid but do nonetheless earn some positive return. This is why, compared to other intermediaries, banks tend to hold a large quantity of short-term money market assets like bills and short-dated government bonds. As we saw earlier in this section, these can be quickly sold, with little risk to their value in the event of a liquidity shortage and yet they still yield a positive return. In most countries, recent years have seen the rapid growth of the 'interbank' market as one of the wider group of money markets. The interbank market allows banks with surplus funds to deposit them with other banks, at interest, for very short periods – often overnight. This is another source of liquidity which banks short of reserves can tap. It reduces their need to hold surplus reserves against possibly unforeseen events. In doing this, the interbank market spreads the existing stock of liquidity across the system as a whole more closely according to need. Banks with a surplus of reserves can lend to banks who are short and would otherwise be constrained in their lending/deposit-taking. This in turn helps the system as a whole to create a quantity of loans and deposits closer to the limits set by the availability of aggregate reserves.

**Payment risk.** Payment risk arises specifically from banks' role in the payments mechanism. When the client of bank *A* makes payment to a client of bank *B*, this initiates an instruction from bank *B* to bank *A* to remit funds to bank *B* (assuming bank *A*'s client has funds available). This transfer takes place between the two banks' deposit accounts with the central bank, described above. Clearly, this takes time. Traditionally, the instructions have taken the written form of a cheque. After the payee pays this into his account (at bank *B*) the cheque has to find its way (through a clearing mechanism) to the payer's bank, *A*. It has then to be verified and instructions given to the central bank to credit bank *B*. If bank *B* makes funds available to its client as soon as the cheque is paid in, it runs the risk that funds may not be available in the drawer's account.

It has then paid out funds which it will not receive. As we all know, the banks' solution to this particular risk is to delay payment on a cheque until the cheque has been 'cleared' and funds received, a process which can take several days. The same risk (and the same solution) applies with automated debits and credits – standing orders, direct debits, electronic salary payments etc. – though here the delay is usually rather shorter.

It is easy to understand that cheque clearing takes time – pieces of paper are being sent through the post after all – and that banks could be at risk of premature payment. It is less obvious that they run the same risk with electronic transfers or with systems that are deliberately designed to allow same-day clearing. In the UK, interbank payments are handled by three companies dealing with (roughly) cheques and other paper-based instructions, electronic payments, and same-day-large-value payments. The latter are handled by the Clearing House Automated Payments Company (CHAPS for short). The system is used mainly by financial institutions. (The Bank of England recently estimated that 60 per cent of CHAPS transactions involved foreign exchange.) The nearest that the personal sector comes to using it is in the process of house purchase when funds may go through the CHAPS system within minutes, in exchange for the door key. Until recently, the CHAPS system itself gave rise to a high degree of payments risk even though settlement took place within the same day. This arose because the UK banking system worked on the basis of 'deferred net settlement' for *all* transactions. This meant that all interbank transfers were accumulated until the end of the trading day, when transfers would be 'netted out'. Payments from bank *A* to bank *B*, for example, would be offset against payment instructions from *B* to *A* and only the balance would actually be paid. Provided that the banks imposed a payment delay of the kind we described above, no risk was involved. But the CHAPS system gave the payee the right to draw funds the moment that the payment instruction was accepted by the payer's bank. This could be early in the morning, in which case the payee's bank would obviously be exposed to the risk of default by the payer's bank until funds were received at the end of the day. This may sound like a rather theoretical risk, but the sums involved are huge. The paper and electronic systems together cleared payments totalling approximately £3,600bn during 2002. In the same year, CHAPS handled c. £82,300bn in the same period.

### More from the web

#### The payments system and payment risk

The payments system in the UK is operated by three separate companies. Fortunately, they all make returns to the Association for Payment Clearing System, APACS, which has a very good website at [www.apacs.org.uk](http://www.apacs.org.uk)

At the APACS website you can find information about the different types of payment instruments handled by the three companies as well as statistical information about the value and volume of payments made by each of these instruments. If you click on 'Payment Facts' and then on 'Cheques' you will see a detailed explanation of the procedures involved in paying by cheque and why it takes cheques several days to pass through the clearing process. The length of time it takes shows why a bank would be exposed to payment risk if it paid out as soon as the cheque was presented.

An excellent discussion of the general principles involved in designing a payments and settlement system is provided by the Bank of England. At the Bank's homepage, [www.bankofengland.co.uk](http://www.bankofengland.co.uk), click on the link to the Centre for Central Banking Studies and then on 'handbooks'. The one you want is no. 8 by David Sheppard.

The average size of a CHAPS transaction in 2002 was c. £2.7m but many were over £100m. Some of these payments exceeded the total value of the capital invested in the bank involved in the transaction. In other words, the failure of one of these large transactions could have wiped out the entire net worth of a bank, leaving its shareholders with nothing and very likely having to organize a panic sale of assets which then leaves it unable to meet its other liabilities (we come back to the role of shareholders' funds in a moment). The bank is quite literally 'bankrupt'. Remember too that if a bank fails there is always the risk of contagion as depositors try to recover what is not just part of their wealth but crucially also their means of payment. No wonder the Bank of England was alarmed at the risks some banks were taking through the CHAPS system.

The only solution to this is for the appropriate funds to accompany each individual payment instruction. If a customer of bank *A* pays £1m to a customer of bank



*B* at 09.30 in the morning, bank *A* must remit £1m at the time of the instruction, regardless of what the balance of its transactions with bank *B* might be at the end of the day. Such a system is known as ‘real-time gross settlement’ (RTGS) and has been adopted for CHAPS payments since 1997. This brings CHAPS into line with the European Monetary Union payments system (known as TARGET). The plan is for all interbank payments in the UK to be made on a RTGS basis in the near future.

**Regulation.** As we have just seen, banks provide a readily accessible home for clients’ savings. We also noted, however, that some bank deposits (probably most sight deposits) perform an additional function as a means of payment. This is particularly true for retail banks. Hence we can see that if a bank should fail, its clients would not only lose part of their wealth: they also lose their means of buying goods and services. A loss of wealth is naturally enough distressing for anyone but losing that part of wealth which functions as money can have dire consequences. For example, a loss of (non-money) financial wealth need involve no instant secondary effects. Victims may look for someone to sue, and they may increase their savings rate in future to restore the lost wealth, but this is not likely to cause disruption to the rest of the economic or financial systems. A loss of the means of payment, however, requires urgent action since bills still have to be paid and some of those bills (eating, travel to work etc.) will fall due immediately. The danger with any bank failure, therefore, is that those affected will immediately withdraw deposits which they may hold with other deposit-taking institutions (triggering liquidity risk for all DTIs). Furthermore it is immediately followed by the distress selling of financial assets as people try to raise money in near-panic circumstances. This pushes down asset prices (triggering asset risk for *all* financial institutions). For this reason, a bank failure may easily be ‘contagious’. Other institutions which are perfectly solvent and liquid in normal circumstances may also fail through liquidity and/or asset risk. This reminds us why a ‘lender of last resort’ was so important in the early stages of banking development. It also explains why banks tend to be subject to a high degree of regulation and supervision, of a quantity and a kind which is unusual for NDTIs.

We have already met one obvious form of regulation – the mandatory reserve requirement. By specifying that banks should hold a minimum ratio of notes and coin plus bankers’ balances at the central bank to their

outstanding deposit liabilities, monetary authorities (usually the central bank itself) could try to eliminate liquidity risk. However, we have also seen that this can be considered as the equivalent of imposing a tax on banks and encourages business to divert to alternative institutions. The trend is to allow banks to set their own reserve requirements and to rely upon the central bank as a source of liquidity in the event of a shortage. Furthermore, liquidity risk is only one form of risk faced by banks and so reserve ratios are only a partial antidote to bank risk.

In the last 25 years or so, regulation has become much more sophisticated, concentrating upon the full range of bank risk and seeking to impose some degree of consistency across systems so that banks can compete internationally on a reasonably level playing field. The organization mainly responsible for the design (but not the enforcement) of the regulations is the Bank for International Settlements, based in Basel. The ‘Basel Committee’s’ approach has been to switch attention from bank liabilities to bank *assets* and from liquid reserves to a bank’s *capital*. Furthermore, in both cases, they focus not just upon total quantities but also upon composition. The critical test, however, remains a bank’s ability to meet a specified ratio – of risk-adjusted total assets to bank capital. The basic principle behind such a ratio is that the risks of carrying on a banking business should be borne by the shareholders rather than the bank’s clients, and that the bank’s capital should be sufficient to absorb any losses that could not be met out of current profits.

In order to understand the role of a bank’s capital in limiting clients’ exposure to risk, we need to understand the structure of a firm’s balance sheet and the relation between assets and liabilities. A glance at Box 2.1, which shows a simplified version of the balance sheet of a typical bank, may help. Throughout this book we shall often refer to the ‘balance sheet identity’ meaning that assets must always be matched by a combination of liabilities and ‘equity’ or capital. (In short  $A \equiv L + E$  where *E* stands for ‘equity’). A balance sheet must always balance and this is clearly true for XYZ. But for readers unfamiliar with the structure of financial statements this must seem a strange idea. After all, many of the items shown as assets and liabilities on the XYZ’s balance sheet are securities which are traded in volatile markets. Their value must fluctuate from day to day. Equally with non-traded assets, customer loans, for example, the value can fluctuate. After all, the value of a loan which goes

**Box 2.1 XYZ bank, consolidated balance sheet (€mn)**

<b>Assets</b>		<b>Liabilities</b>	
Cash and balances at the central bank	5,000	Sight deposits	109,000
Money-market loans	210,000	Time deposits	110,500
Loans and advances	222,000	Savings deposits	86,500
Securities	105,000	Repos	35,000
Insurance company investments	64,500	CDs, bonds and securities	83,400
Accrued income and other assets	155,500	Reserves of insurance companies	54,750
		Loans from other MFIs	22,100
		Accrued expenses etc	184,750
		Other liabilities	25,000
		Shareholders' funds, reserves etc	51,000
<i>Total</i>	<i>762,000</i>	<i>Total</i>	<i>762,000</i>

into default is probably zero. How can it be therefore that, whatever it does, a firm is guaranteed to find that its assets match its liabilities plus equity? The answer lies in the behaviour of the  $E$  part of our identity. Another way of approaching this is to think of  $E$  as expressing the 'net worth' of the company or the difference between its assets and liabilities. For a thriving firm,  $E$  will be positive, so yet another way of thinking about equity is to think of it as the *excess* of assets over liabilities. On the other hand, where  $E$  is negative, a firm has negative net worth, its assets are insufficient to match its liabilities and it is technically insolvent.

In practice a firm's liabilities are given. (Indeed the term 'liability' has a legal meaning signifying that it is an obligation to someone that *must* be honoured.) Fluctuations in a bank's net worth, therefore, are usually the outcome of shocks to the value of its assets as we saw above with a fall in security prices or defaults on its loans. In normal circumstances, such events will result in a reduction in its equity and thus in effect in the value of the firm to its shareholders. This happens because the equity consists of:

- the value of the funds originally committed to the firm (when it was first incorporated);
- plus any funds committed later by subsequent share issues;
- plus the accumulated earnings retained from each year's profit;
- plus this year's retained earnings.

Although the first two items alone strictly make up 'shareholders' funds' – the funds that shareholders have committed to the firm – the whole of this equity (the firm's net worth) belongs to shareholders and is one component in the value of the shares they own.

Imagine now the case where a borrower with a large loan defaults. If there is absolutely no chance of the bank recovering any part of the loan, the loan's value as an asset falls to zero. In the simplest case, a bank will 'write-off' the value of this loan in the year of default. In effect, it is deducted from any profit the firm may have earned. The retained earnings for the year in question are reduced and the equity will be less than it would otherwise have been. In an extreme case, the default could be so large that it exceeds the whole of the value of the equity. Then the firm has negative net worth and will not have sufficient assets to meet its liabilities. In these circumstances it is insolvent and, since we are talking about a bank, will not be able to repay all customers' deposits. We noted the consequences of such a failure in connection with payment risk above. Given that payment and asset risks are all risks that banks must face – however good their asset management – it is clearly important that banks have sufficiently large equity or capital that they can meet all reasonably conceivable shocks without experiencing negative net worth and threatening the wealth of depositors who have dealt with the bank in all good faith and are in no way responsible for the problem. This is why the Basel Committee decided many years ago to specify minimum

levels of capital that a bank must have in relation to the risks that it faced. If something goes seriously wrong with the bank, there should be sufficient equity to ensure that the shock is borne entirely by shareholders and not by (innocent) clients of the bank.

Under the Basel Committee's 1988 proposals ('Basel I', adopted by most industrial countries in 1993) assets are divided into five groups or classes, each with its own risk-weighting, lower weights being given to less risky assets. Thus, cash has a weight of 0, loans to the discount market are weighted at 0.1, local authority bonds 0.2, mortgage loans 0.5, while commercial loans have the full weight of 1. The method of assessment, broadly speaking, is to multiply the market value of each asset by its risk factor and then to aggregate the risk-adjusted value. This is then compared with the bank's capital base.

Capital, in turn, has a two-tier classification. Tier I or core capital consists essentially of shareholders' equity, disclosed reserves and the current year's retained profits, which are readily available to cushion losses – these must be verified by the bank's auditors. Tier II or supplementary capital comprises funds available but not fully owned or controlled by the institution such as 'general' provisions that the bank had set aside against unidentified future losses and medium- or long-term subordinated debt issued by the bank.

When it comes to the ratios, tier II elements are not permitted to make up more than 50 per cent of an institution's own funds. More fundamentally, the Basel Committee recommended a lower limit of 8 per cent for the ratio of total capital to risk-adjusted assets, though national bank supervisors had some discretion in applying this to different types of bank. Monitoring and enforcement of these requirements lies with national bodies. In the UK until 1998 this was the Bank of England but is now the Financial Services Authority. Subject to enforcing the Basel Committee's capital requirements, national regulators may impose further restrictions. The UK FSA, for example, recognizes a 'tier III' level of capital.

Notice that these requirements, just like a simple reserve ratio, are built upon the weighing and comparing of items in a balance sheet. Indeed, it is difficult to see how else regulators could proceed. To show that rules are being observed or breached there has to be documentary evidence and the obvious documentary evidence must be a firm's accounts. Basing regulation upon the composition of balance sheets has, however, had an interesting though perhaps predictable

consequence. It has encouraged banks that wish to expand, but find the capital requirements constraining, to develop 'off-balance-sheet activities'. These are activities which generate revenue (and ultimately profit) without requiring a corresponding entry in the balance sheet. An early example is provided by the so-called 'bill leak' in the UK during the 1970s. For most of the 1970s UK banks were restricted (by the 'supplementary special deposit scheme') to allowing their eligible liabilities (roughly deposits) to grow only at a maximum specified rate. This restricted banks' ability to lend and both loan and deposit growth could be checked from banks' accounts. Corporate clients took to issuing commercial bills (see Section 15.2) in order to borrow directly in the money markets. Firms and banks then quickly realized that both could benefit if banks were to 'accept' or guarantee the bills at the time of issue. The guarantee made the bills more secure from the markets' point of view and so firms were charged a lower rate of interest; at the same time banks charged a fee for the guarantee, thus replacing some of the profit they were forgoing by having their normal lending business restricted. A more widespread practice today is the practice of 'securitization'. A bank which finds the capital requirements constraining, typically establishes a subsidiary which then 'buys' loans from the parent bank. In order to do this, it sells bonds (i.e. securities) to the market. The bank passes the loan interest to the subsidiary which then passes it on, less a premium for expenses and profit, to the bondholders. So far as the originating bank is concerned, the loans have disappeared 'off-balance-sheet'. The

#### **More from the web** **More on the 'Basel Accord' and bank risk**

At the time of writing, the Basel capital requirements described on this page are still under review – a process which has been going on for some years.

The work of the Basel Committee, and the progress of the revisions, is described on the website of the Bank for International Settlements:  
[www.bis.org](http://www.bis.org)

At the BIS homepage, click on 'Basel Committee'.

The firm of BarrettWells also hosts a website which deals with 'risk' in a broad financial context and at a much more sophisticated level than we can do here. Material specifically related to bank risk can be found at: [www.barrettwells.co.uk/bank\\_risk.htm](http://www.barrettwells.co.uk/bank_risk.htm)

capital:asset ratio is increased and expansion can resume. Finding ways of measuring and controlling the risk of these so-called ‘contingent liabilities’ is the next big test for regulators.

## 2.4 Non-deposit-taking institutions – insurance companies and pension funds

In the preceding section, we looked in some detail at deposit-taking institutions and in particular at banks. As we saw there, deposits are a unique kind of liability: individuals who hold deposits can require the financial institutions whose liabilities they are to pay them their value in money on demand (‘at sight’) or at short notice – in other words, more or less at the holders’ discretion. In contrast, a non-deposit-taking institution (NDTI) is under no obligation to provide clients with anything like ready access to the funds they have placed with it. What is more, clients are often bound by contract to make payments *to* the NDTI. For example, an endowment policy commits the policyholder to making regular payments (premiums) to an insurance company over many years.

NDTIs are often collectively referred to as the ‘institutional investors’. This is because of their role in taking in savings from households and firms and pooling them before investing in securities of many different kinds. As we shall see, investing institutions have the advantage of being able to buy and sell in large quantities and thus to enjoy low unit transaction costs. They also offer the benefits of professional analysts who should have an information advantage (over private investors) when it comes to asset selection. The term ‘institutional investor’ covers pension funds, insurance companies and mutual funds. By size, the first two are by far the largest and we look at the main principles under which they operate in the rest of this section. Mutual funds are the subject of Section 2.5.

Differences in the size and role of the institutional investors provide the main differences between financial systems around the world, but especially in Europe.

For example, the assets of institutional investors in the G7 countries amount to approximately the same value as the combined G7 GDP. But there are very big differences between countries. In the UK and US, their assets are nearer twice the size of corresponding GDP while in continental Europe the figure is nearer 50 per cent. It follows from this that the markets for institutional investment (the range of products offered, for example) are much nearer to maturity in the Anglo-Saxon countries than in continental Europe. From this, it is a reasonable guess that much of the evolution in continental financial systems is likely to come via the investing institutions, rather than through markets. Historically, the reasons for this continental/Anglo-Saxon split lie with supply side factors like deregulation and enhanced competition and demand side factors like higher wealth and demographic factors which led, some years ago, to a concern that individuals should take a much larger responsibility for their own pensions by accumulating an equity-based investment fund. Much of continental Europe is still dominated by ‘pay-as-you-go’ social security systems, raising the same demographic issues. How to pay for pensions, and the implications that this has for financial institutions and other firms, is a recurrent theme through these next few chapters.

### Insurance companies

The endowment and other policies that *life insurers* (often referred to as **life offices**) issue are, as we have just noted, long-term contracts. The maturity date of a policy of this kind is almost invariably at least 10 years from its inception date and often much longer. Policyholders pay regular premiums in return for the prospect of a payout, on death or at maturity, that will, they hope, represent a worthwhile return on these premiums. In most cases, policyholders take out life insurance primarily as a means of building up savings.

**General insurers** (otherwise known as *non-life offices*) offer cover against day-to-day risks, of which the most important categories are home, marine, vehicle and liability to third parties.<sup>1</sup> In contrast to life insurance, non-life policies are generally issued and renewed on an annual basis.

<sup>1</sup> Third-party liability insurance involves the insurer in covering the insured against the risk of having to pay compensation for some act or omission as a result of which a third party suffers damage or loss. For example, a failure by an employer to provide safe working conditions could lead to claims for damages from workers who have suffered illness or injury as a result. Employer liability insurance exists to protect the employer against the risk of such claims. In the next section of this chapter, we refer to the dramatic case of the massive accumulation of insurance claims that resulted from employer liability for the contraction by employees of asbestosis and related diseases.

**Reinsurance** represents a third major area of insurance activity. Reinsurance enables one insurer to ‘lay off’ risks it considers excessive on business it has ‘written’.<sup>2</sup> It does so by itself buying insurance from another office.

### Pension funds

Occupational pensions are paid to retired people who have been members of pension schemes run by their employers during their working lives. Many schemes require both employees and the employer to make regular contributions into a fund – the *pension fund* – which is invested in stock market securities and other assets. If the fund is to remain continuously solvent, contributions received, supplemented by the returns earned on them, need to be sufficient to meet liabilities to pay pensions out of the fund, as these fall due. The administration of the scheme and/or the investment of the fund may be entrusted to a life insurance company.

## 2.4.1 Some principles of insurance

### The Law of Large Numbers: from dice throws to insurance

The outcome of a particular event may be very difficult to predict. However, in many situations, the *average* outcome of a large number of similar events is, in contrast, highly predictable. The Law of Large Numbers (LLN) is based on this fact. It is true to say that insurance would not be possible if the LLN did not ‘work’. For that reason, we need to examine it in some detail.

Even though the connection between dice throws and insurance may not seem immediately obvious, thinking about patterns of scores that emerge when one or more dice are thrown repeatedly turns out to be a useful way of gaining an insight into how the LLN operates in insurance. First we consider a single

die. Then we look at average scores from simultaneous throws of a *pair* of dice.

In the terminology of statistical theory, the score on one throw of a single die represents one member of an infinite ‘population’ of possible ‘observations’. What is the population? It consists of the scores on all the throws of the die in question that there have been in the past and all those that there might potentially be in the future. Suppose the die is *unbiased*, that is, any one score is equally as likely as any other. Each observation, in other words, the score on any one throw, must be a whole number between 1 and 6, and the probability of it being any one of these numbers is 1/6. It follows that:

- the population mean,  $\mu$ , the mean of scores of the whole (infinite) population of possible throws of that die, equals:

$$1/6(1) + 1/6(2) + \dots + 1/6(6) = 3.5 \quad (2.1)$$

and that

- the standard deviation<sup>3</sup> of the whole population of possible scores,  $\sigma$ , is equal to

$$\sqrt{\left[ \frac{1}{6}(1 - 3.5)^2 + \frac{1}{6}(2 - 3.5)^2 + \dots + (6 - 3.5)^2 \right]} \approx 1.71 \quad (2.2)$$

Now we can say that any one throw of the die represents one *sample*, of size 1, from this population. As only one die is thrown, the average score for the sample *is* the score shown on the die.<sup>4</sup> We can call the average score on any sample, whatever its size, the *sample average*. Obviously, the value of the sample average will vary between one sample and the next. It follows that the sample average is itself a *variable* which has its own **mean**<sup>5</sup> and **standard deviation**. In this one-die case, sample averages, being identical to the scores on different throws, will be distributed

<sup>2</sup> That is, on policies it has issued to its own clients.

<sup>3</sup> If you need to revise the meaning and calculation of a standard deviation, go to Section 8.2.

<sup>4</sup> In general terms, average = total ÷ number of observations. When only one die is thrown the number of observations is 1, the average equals the total, so the average score is simply the score itself. It may therefore seem strange that we differentiate between the average and the total in this case. However, there is a good reason for doing so, and this should become clear shortly when we consider the case of two dice thrown simultaneously.

<sup>5</sup> It may seem odd to talk in terms of the ‘mean’ of an ‘average’, but a moment’s thought will show that doing so makes sense. Suppose we take repeated samples of some type or other (e.g., samples of 10 students’ weights) and then record the average weight in these samples. The average of each individual sample (of 10) will be a member of the whole population of averages of samples (of 10), and this population must have a mean.

around their population mean in an identical way to these scores. Thus we can say that the sample average of single throws of a die will have  $\mu = 3.5$  and  $\sigma \approx 1.71$ .

Table 2.2 depicts the distribution of sample averages for single throws of an unbiased die. Note that the distribution is *uniform*, that is, it is flat and does not peak around any particular value.

Suppose, now, a pair of dice are thrown at the same time. The score on each die will again be a number between 1 and 6. Consequently, one throw of a pair of dice could produce any of 36 different outcomes, from a [1,1], (i.e., a 1 on the first and a 1 on the second die) to [1,2], (a 1 on the first and a 2 on the second), and so on through to [6,6]. All 36 possible outcomes are shown in Table 2.3.

Throwing a pair of dice together produces samples of size 2. The total and average score in each sample will now be different, and we have to divide the total by 2 to obtain its average. By throwing the pair of dice

again and again, we would obtain repeated samples and thus a series of sample averages. Just as in the one-die case, the value of the sample average can vary between 1 and 6, but this time with gradations of 0.5. These are shown in the bottom row of Table 2.3. The probability of the sample average taking any particular value can be read off along the vertical axis.

What happens to the mean and the standard deviation of the sample average when we increase the number of dice thrown from one to two? Outcomes remain distributed symmetrically around the value 3.5, leaving the mean unaffected, i.e.,  $\mu$  remains equal to 3.5. But note the effect on the *way* sample averages are distributed around this mean. Comparing Table 2.3 with Table 2.2, we can see that this ceases to be uniform once the sample size is increased to 2. Rather, when a pair of dice are thrown at the same time, a sample average that is close to the mean is more likely than one that is much higher or lower than it.<sup>6</sup> In other words, when the sample size increases, the dispersion

**Table 2.2**

Probability =	1/6	1/6	1/6	1/6	1/6	1/6
Value	1	2	3	4	5	6

**Table 2.3**

Prob											
6/36						4,3					
5/36					3,3	3,4	4,4				
4/36				3,2	4,2	5,2	5,3	5,4			
3/36			2,2	2,3	2,4	2,5	3,5	4,5	5,5		
2/36		2,1	3,1	4,1	5,1	6,1	6,2	6,3	6,4	6,5	
1/36	1,1	1,2	1,3	1,4	1,5	1,6	2,6	3,6	4,6	5,6	6,6
2-dice total	2	3	4	5	6	7	8	9	10	11	12
Sample average	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6

<sup>6</sup> For example, Table 2.3 tells us that, when a pair of dice are thrown, the probability of an average score lying between 2.5 and 3.5 is  $\frac{16}{36}$  or, in other words, more than 44 per cent. In contrast, the chance of an average score of 2 or less or, on the other hand, 5 or more is, in either case,  $\frac{6}{36}$  or less than 17 per cent.

**Exercise 2.1**

We could increase the number of dice thrown together to 3, 5, 10 or more and work out the sample average each time we throw any specific number of dice.

- (a) What will happen to  $\mu$  and  $\sigma$ , the mean and standard deviation of the sample average, as we increase the number of dice thrown?
- (b) What will happen to  $\sigma$  as the number of dice thrown increases towards infinity?

(Answers appear in the text below.)

of sample averages around their mean is reduced. This is illustrated by the fact that, when the number of dice thrown rises from 1 to 2, the standard deviation of sample averages,  $\sigma$ , can be shown to fall from 1.71 to 1.21. Now think about the questions in Exercise 2.1.

These questions illustrate the operation of the LLN. As the size of the sample we take increases, the variability of sample averages around the mean of the population of samples diminishes. Indeed, as the sample size grows towards infinity, the standard deviation of the sample averages diminishes towards zero. *Thus, the more we increase the size of the sample, the less chance there is that the averages of samples we take will differ significantly from the mean and therefore from one another.*

### Applying the Law of Large Numbers to insurance

We are now in a position to move on from talking about dice to discussing the application of the LLN to insurance. Consider an imaginary insurance company that offers households cover against burglary. Suppose policies are renewed annually. Each household covered in each year represents a single observation (with two possible outcomes: *loss* or *no loss*). The population consists of all the possible observations of all the possible households in all the possible years in which these households might exist – an infinite population.

Suppose that every household faces a 1 in 100 chance that it will be burgled in any one year and that, if a burglary occurs, it will suffer a loss of £2,500.<sup>7</sup> We can write:  $E(\text{loss}) = 0.99(0) + 0.01(2500) = £25$ , where  $E(\text{loss})$  denotes the (statistically) expected loss per household. Note straightaway that:

- each household will *either* lose £2,500 *or* nothing at all in any year;
  - no household will incur the ‘expected’ loss of £25;
- and
- the outcome for each household is highly variable – either no loss or ‘big’ loss.

From the point of view of the company insuring these households, the ‘experience’ of insuring any one of them in any year will be either ‘no claim’ or ‘£2,500 claim’. Suppose the company insures 100,000 households in any year. Its overall claims experience in each year can be thought of as a sample comprising 100,000 such individual claims experiences. Each year will represent a different sample.

Now the number of households that suffer burglary in any one year’s sample will vary. However, the mean number of households burgled in any one year will be 1,000. It follows that the mean household loss through burglary, taking one year with the next, will be  $£2.5\text{m}/100,000 = £25$ . Thanks to the LLN, our insurer can expect the number of households suffering a burglary in any year to be close to the mean of 1,000.<sup>8</sup> It follows that the insurer can be fairly confident that:

- its average loss per household insured (its sample average) in any year will be close to  $£2.5\text{m}/100,000 = £25$ ,
- and therefore that,
- if it charges each householder a premium of £25, it will be able to meet total claims for loss out of the premium income it will receive.

You should now be able to answer the question in Exercise 2.2.

<sup>7</sup> Assume, for simplicity, that no household is burgled more than once in any year.

<sup>8</sup> We consider some qualifications to this statement in the next section.

**Exercise 2.2**

Insurance does not prevent losses from happening. How then is it possible that insurers are able to cover individual policyholders financially against the risk of loss?

(The first paragraph of the next section of this chapter contains an answer to this question.)

### 2.4.2 Insurers' residual risks and other limits to the insurance principle

Insurance reduces neither the frequency with which events that result in loss occur nor the amounts lost when they do. Rather, as far as policyholders are concerned, it eliminates the risks associated with the *possibility* of loss. For, by taking out insurance cover, an individual converts the *chance* of a large loss into the *certainty* of a very small one: if the event insured against occurs, the insured loses no more than the premium paid; if it does not, he or she loses no less than this amount. Thanks to the LLN, an insurance company can in this way eliminate risk faced by its clients without at the same time being obliged to take on an equivalent amount of risk itself. This is because the LLN will make the total value of claims for loss that the company will be called upon to meet each year a reasonably predictable sum. As a result, insurance reduces the overall amount of risk faced by society as a whole. Nevertheless, we need to recognize that the LLN does not entirely eliminate the risks the insurance company faces. It merely reduces them to manageable proportions. This is because, however well the LLN operates, three sources of *residual* risk remain to confront the insurer. We give them the names:

- random fluctuation;
- mis-estimation;
- parameter change.

We look next at each in turn and then at a list of other conditions which must apply in order for the LLN to operate effectively.

#### (1) Random fluctuation

In the example we used to illustrate the LLN, the mean of average annual burglary losses per household, taking

one year with the next, was £25. However, the average loss itself will differ from year to year, because each year represents a different sample and, as we know, sample averages vary randomly around their mean. As a result, the insurer will sometimes come up against 'bad years' in which the average household loss through burglary turns out to be above and, on occasions, considerably above, the mean of £25. If, as suggested in the preceding section, premiums are set equal to this mean, the insurer will face a financial shortfall in such years, as the cost of settling claims will exceed premium income, possibly by a large margin.

For the purposes of illustration, let us assume that the average annual burglary loss per household is normally distributed around its mean of £25, as shown in Figure 2.1. Then in some years ('bad' years), the outcome will be at the lower tail of the distribution. Although the probability of a 'bad' year (represented by the shaded area in Figure 2.1) may be small, the point to remember is that the risk of 'bad' years cannot be entirely eliminated. It is part and parcel of the way the LLN operates. That said, an insurance company can protect itself in a number of ways.

Firstly, so long as the average losses per household in different years are distributed randomly around their mean, years in which shortfalls are recorded will tend to be matched by years in which the cost of settling claims turns out to be lower than premium income and the insurer's accounts consequently show a surplus. The company can, of course, add surpluses to its financial reserves, drawing on them to preserve its solvency in years in which shortfalls occur. It has to be recognized, however, that the insurer still faces the risk of a total volume of claims so high in some years that previously accumulated surpluses will prove insufficient to cover current shortfalls in premium income. Even though this risk may seem a remote one,

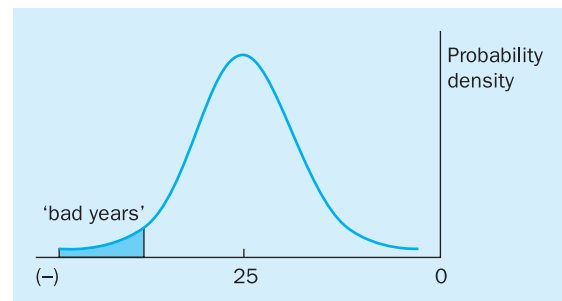


Figure 2.1



it represents a threat to the company's solvency and therefore to its ability to offer policyholders what they are ultimately looking for from an insurer – peace of mind. One prudent course of action the company can take is to add what is known as **loading** to the premiums it charges, that is, to set premiums above the mean level of average annual claims per household. The purpose would be to enable it to enlarge the size of its financial reserve, giving itself a better chance of withstanding highly adverse claims experiences.<sup>9</sup>

Secondly, the insurer could try to expand the scale of its operations. If it can increase the amount of business it does (that is, increase the volume and value of the policies it writes), it should be able to extend the effect of the LLN and thereby reduce further the variability of its average claims experience around the mean annual loss and with it the possibility of an unmanageably high claims level in any particular year.

Thirdly, it could try to diversify its business portfolio further. The more diverse the range of risks for which it provides cover, the more likely it is that high levels of claims in some classes of business in any given year will be offset by low claims levels in others. Once again, the effect will be to reduce the variability of its annual financial outturn.

A final option open to insurers wishing to mitigate the risks inherent in random fluctuations in their claims experience is to obtain reinsurance. By 'laying off' some risk in this way, the company will earn lower surpluses in good years but limit the net cost to itself of settling claims even in bad ones.

## (2) Mis-estimation

So far, it has been convenient to simplify our discussion of insurer's risk by assuming that our insurer *knows* the size of the true population mean loss through burglary of the households it insures. However, if we think about it, we will quickly realize that this assumption cannot be realistic. For the population of burglary experiences is infinite and the value of the mean loss resulting from such experiences cannot therefore be known for certain by insurers or anyone else.

Nevertheless, insurers will wish to relate the premiums they charge to their clients' likely average experience of loss. In practice, therefore, they will have no alternative but to make *estimates* of the value of the mean losses incurred by policyholders. They will

do so by using their own past experience of providing cover for clients or obtain data on claims experiences elsewhere in the wider insurance industry.

To illustrate the problems inherent in having to rely on an estimate of the mean loss, suppose that the insurance company in our example computes the average burglary losses per household in each year of the last 10 and then uses the average of these averages as its estimate of the mean loss. Now, this estimate is the average of a sample 10, and we know that, even if samples are not biased in any way, their averages will vary randomly from the true population mean. As a result, the company faces the risk that any estimate it makes will be a *mis*-estimate of the mean loss.

**Mis-estimation** could take the form either of an under- or an overestimation. Either way, inaccuracy in the company's estimate will increase its risk of insolvency. Consider underestimation first. If the company bases the premiums it charges on an underestimate of the mean loss, premiums will be set at an unduly low level and, as a result, there are likely to be an unduly high number of years in which premium income is insufficient to cover total claims. The danger is all the more likely because the company's low rates of premium are likely to attract business towards it and away from competitors. Note that because this business increases the risk of financial shortfalls it is in fact unprofitable at the rates of premium the company charges.

If, on the other hand, the company overestimates the mean loss, this could well lead it to set its premiums at an unduly high level. As a result, it will be in danger of losing business to competitors, business that would have been on average profitable even at lower rates of premium. As a result, the volume of business it will write will be smaller than otherwise and it will derive less benefit from the LLN. This means that the variability of its annual financial results will be higher than otherwise. It should be clear that the security of its position is thereby reduced. The problem of mis-estimation is illustrated in Figure 2.2. Suppose that curve A depicts the *true* distribution of annual average losses through burglary. If the insurer had some way of knowing where this true distribution lay, it could base its premiums on the true mean average loss figure (£*a*). Unfortunately, it can only try to estimate the position of curve A by using sample data based on its own or other companies' claims experience. Because

<sup>9</sup> State regulation of insurance companies aims to guard against this risk. The regulatory system in the UK is discussed in Chapter 25.

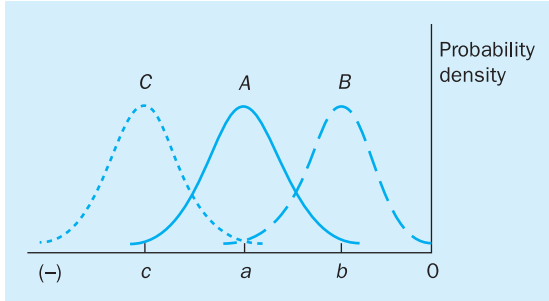


Figure 2.2

sample averages vary around the true mean, it may wrongly come to believe that the distribution of annual average losses is represented by curve *B*. In that case, it will base its premiums on a figure of  $\pounds b$ , an underestimate of the mean average loss. On the other hand the data it has available may lead the company to believe, just as wrongly, that curve *C* depicts the distribution of annual average losses. It might then base premiums on an overestimate of the mean average loss, believing it to be as high as  $\pounds c$ .

What can an insurance company do to protect itself against the risk of mis-estimation of the mean loss? Obviously, reinsurance will allow a company to limit the adverse consequence to itself of mis-estimating the mean policyholder loss. Secondly, adding a loading to premiums in recognition of this risk in order to build up a company's financial reserve will be useful in that it will help carry it through years of financial shortfall produced either by the unduly low premium levels that would result from an underestimation of the mean loss, or the unduly high one that would result from an overestimation. Eventually any mis-estimation will become apparent from experience, and the company can then adjust premium levels appropriately – provided it can survive that long. Building up its reserve will increase its chances of doing so.

Both under- and overestimation of the mean loss will, as we have noted, result in financial problems for an insurer. Hence, in the case of mis-estimation, errors in one direction will not offset errors in the other. It follows that diversification of a company's range of business will do nothing to mitigate the risk of mis-estimation. The other side of this particular coin is that this risk is a reason for insurers to take diversification gradually. For, as we have also just noted, the risk of mis-estimation diminishes over time, as an insurance company accumulates experience of an emerging pattern of claims within a particular class of business.

A core of established business will therefore tend to add to the stability of the financial results a company achieves. This core can in turn offer it a financial cushion enabling it to withstand the potential adverse financial consequences of taking on new classes of business, with the inherent risk of mis-estimation that entails. However, a major proviso here is that the scale of the new business taken on at any one time must not be too large.

### (3) Parameter change

Actuaries seek to provide a rational basis for an insurer's pricing structure by estimating risks of losses across the various classes of business as reliably as possible from the data to hand as a basis for determining premiums. Mis-estimation is one example of actuarial error. As the preceding discussion has shown, it results from random variation in sample averages, and the possibility of such sampling error cannot be eliminated even if the characteristics (or *parameters*) of the population from which samples are drawn are stable over time. The scope for actuarial error is, however, very much broadened by the fact that stability in these parameters cannot by any means be counted on. On the contrary, they are dependent on social, environmental, technological and other factors and will change as the latter do. It follows that the past is not necessarily a good guide to the future however well we have learned to analyse the former.

To illustrate this point, consider Figure 2.3. Suppose that initially actuaries have accurately estimated the position of the distribution of annual average burglary losses (curve 1). Relying on their advice, the insurance company, basing its premiums on an estimated mean average loss of  $\pounds 25$ , encounters no difficulty in meeting claims out of premium income. As time passes, however, social conditions change, causing the incidence

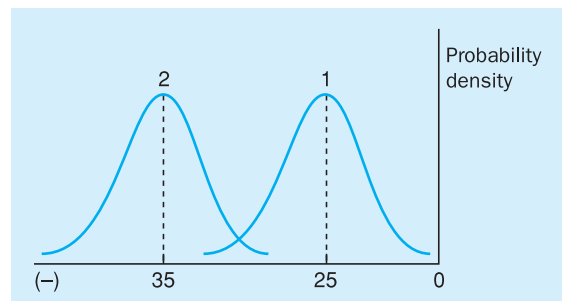


Figure 2.3

of burglary to rise and as a result changing the parameters of the annual average loss distribution so that its position is now represented by curve 2. The mean average annual loss is now £35. However, because they have no choice but to rely on past data, actuaries take some time to identify this parameter shift. In the meantime, if the insurance company continues to base its premiums on the now unduly low estimate of annual average losses of £25, it could find its solvency under threat.

The scale of asbestos-related losses suffered by Lloyds 'names' in recent decades is perhaps the most spectacular illustration of the potentially devastating consequences of parameter change for insurers to have emerged in the last 30 years. In the 1950s and 1960s, before the health hazards associated with asbestos were properly understood, Lloyds names underwrote large numbers of health and safety insurance policies in the USA. Asbestos was then very widely used as a fireproofing material. Awareness of the causes of asbestosis and related conditions, however, developed in the 1970s, and asbestos-related insurance claims submitted to Lloyds reached 6,000 per annum by the early 1980s and 24,000 per annum ten years later. By the early 1990s, names had settled asbestos-related claims totalling £8bn. In all, some 34,000 individual underwriters lost money as a result of these claims. Many were forced to sell their houses and businesses to meet their debts. Recriminations over the crisis continued. In November 2000, after a high-profile hearing lasting several months, a judge in the High Court in London finally dismissed a massive claim for compensation against Lloyds mounted by more than 230 names who had lost money as a result of asbestos-related claims.<sup>10</sup>

Clearly, building an adequate level of reserves can go some way towards helping an insurance company limit the threat to its solvency that parameter change poses, as indeed can reinsurance. Diversification, too, may help, so long as cases of beneficial and adverse parameter change tend to cancel one another out and insurers as a whole tend to err in the same direction at the same time. In that case, if one company fails to anticipate beneficial parameter changes and as a result charges unnecessarily high premiums on a particular class of business, others will tend to have done

the same. As a result, an underwriting surplus will be generated for the sector as a whole which will be available to cover losses as a result of failures to anticipate negative parameter changes affecting other classes of business.

### Other limits to the insurance principle

Insurance works on the principle that it is possible for an intermediary – the insurer – to organize a financially solvent risk-pooling arrangement which removes the exposure to some risk that a group of individuals would otherwise face. In the discussion so far we have shown how this principle relies on the Law of Large Numbers. At the same time we have made it clear that, however well the LLN operates, insurers remain exposed to certain residual risks.

In fact, for the LLN to operate effectively, a number of other conditions must also be satisfied. The most important of these can easily be stated. They are that the exposures an insurer is called upon to cover must be:

- large in number;
- part of a known phenomenon;
- statistically independent of one another;
- homogeneous in character;
- unaffected by the fact of insurance;
- borne by individuals who can afford to insure themselves.

#### Exercise 2.3

State, with reasons, which of the following is an example of (i) random fluctuation; (ii) mis-estimation; (iii) parameter change:

- (a) Company X, which has charged relatively low premiums to a particular class of policyholders for a long time, finds that in a significant proportion of years this class of business proves unprofitable.
- (b) Exceptionally cold weather leads to a high level of claims for loss due to burst water pipes.
- (c) Subsidence claims have proved particularly expensive for insurers in recent years.

<sup>10</sup> See 'Lloyds names "fleeced in £4bn fraud"', *The Guardian*, 7 March 2000 and 'How the names lost their shirts', *The Guardian*, 4 November 2000.

Quite commonly, one or more of these conditions will not be met. As a result, the applicability of the insurance principle will very often be severely limited – as this section explains.

### (1) Small numbers of exposures

Some perils are specific to relatively few individual cases, with the result that there may only be a small number of exposures to them extant at any one point in time. For example, injury to a virtuoso concert pianist's hands would mean a massive loss of earning capacity for the performer concerned. But how many truly virtuoso pianists are there?

An insurance company which offered cover to a small number of clients facing an uncommon risk would be likely to find that its year-to-year claims experience in relation to this risk was highly variable. Consequently, the risk to the company that claims levels could turn out to be considerably higher than premium income would be significant in every single year that it wrote such business. As we know from our earlier discussion, an insurer operating in such conditions would be highly exposed to the risk of insolvency. For this reason, insurers will tend to be reluctant to cover classes of risk characterized by small total numbers of exposures and, in these circumstances, the risks in question could prove to be more or less *uninsurable*.<sup>11</sup>

Now, to take just one example, there is a multitude of highly specific risks in the field of the performing arts and entertainment alone, not only risks to pianists' hands but risks to tenors' voices, to ballet dancers' legs and to various parts of other celebrities' bodies which we leave to the reader to imagine. One way in which insurers seek to meet the demand for cover despite the threats to them posed by small numbers of exposures is to respond to this multiplicity of risks by organizing multiple underwriting syndicates, each of which underwrites one specific risk. Within each syndicate, any one insurer takes on only a small proportion of the overall risk, and each insurer may participate in a number of different syndicates. There is then a good chance that the risks concerned will become more readily insurable because:

- (a) each individual insurance company will be able to limit the loss to itself that would arise from a high level of claims in respect of any one risk in any year;
- (b) provided there was not a strong positive correlation between the different risks covered, the total of claims any insurer would be likely to be called upon to meet in any year as a result of involvement in various syndicates should also lie within acceptable bounds.

The formation of such syndicates enables insurers to create underwriting *portfolios*. The discussion in Section 8.3 shows how holding a portfolio of stock market securities can reduce an investor's risk. It should be clear that underwriting portfolios offer insurers similar benefits in terms of risk reduction.

### (2) Unknown phenomena

We have seen that insurers try to set premiums by reference to estimates of average expected claims levels on policies of different types. These estimates are based on past claims history and other indicators such as officially published statistics on crime, mortality and morbidity rates. What, however, if the risk clients wish to be insured against is a hitherto unknown one? In a fast changing world, novel risk situations arise continuously. Obvious topical examples relate to the spread of new information technologies. For example, in the latter part of the 1990s there was widespread international concern that the arrival of the new millennium would be marked by computer failure on a monumental scale. But nothing comparable to this danger had ever arisen before and therefore there was nothing in insurers' combined past underwriting experience that they could have used to guide them in setting premiums for covering millennium-bug-related risks. Similarly, the risk of cyber-vandalism (such as the spreading of computer viruses) is becoming an increasingly serious one for organizations worldwide and one against which it would be natural for many to wish to insure themselves. However, until society gains much more familiarity with this phenomenon, premium setting will be little more than guesswork.

<sup>11</sup> A risk can be said to be uninsurable when no insurer is prepared to offer cover against it or, on a less strict definition, when cover is only available at prohibitively high rates. For example, suppose £500 was the lowest annual premium quoted for insurance of an item worth £1,000. Unless there was a very high probability that it would be lost or damaged in any year, the owner of the item would be likely to regard insurance as too expensive to contemplate and the item would for all intents and purposes be uninsurable.

When the risk is a new one, insurers could quite easily underestimate claims levels by a substantial margin and, as a result, set premiums at much too low a level to cover them. Furthermore, the problem could be compounded by small numbers of exposures: if a risk is novel, the numbers of individuals confronted by it may not be large. The risks to an insurer inherent in offering cover against novel kinds of loss exposure could threaten to make some of them uninsurable. Here again, though, the formation of underwriting syndicates may offer individual insurers sufficient protection of their own positions to persuade them that writing some business of this kind is viable.

### (3) Positively correlated risks

Returning yet again to the burglary example used earlier to illustrate the LLN, suppose now that the incidence of burglary in a particular neighbourhood varies from year to year. In particular, suppose that there is either a crime wave and many houses in the same vicinity are broken into over the same period, or the whole area is relatively crime free for that length of time. In these circumstances, it is clear that the chances of burglary facing any two houses in the neighbourhood will not be statistically independent. If one house has been burgled recently, the chances will be relatively high that neighbouring properties will shortly suffer the same fate. On the other hand, if there have been no attempts to break into any one house in the locality recently, nearby properties will be relatively safe for the time being.

We are here describing a situation in which individual risks are positively correlated with one another. In Box 8.2 we show how diversifying our holdings of risky assets usually reduces risk. This is because the returns on two assets are usually less than perfectly correlated. Technically speaking, the correlation coefficient of returns between assets  $x$  and  $y$ ,  $\rho_{x,y}$ , is less than +1. But note that the risk reduction effect is at its maximum when  $\rho_{x,y} = -1$  and diminishes as the value of  $\rho_{x,y}$  approaches +1. The same is true of any set of random variables, including sample averages. The point to emphasize is that the presence of positive correlation between individual exposures to a given risk diminishes the variance-reducing effects of the LLN and, as a result, makes insurers' claims experiences more variable. In some years this will work to the

insurer's advantage since it will result in a low level of claims. However, if it is true that losses tend to occur together, there will be other years in which claims may well far exceed premium income. To protect themselves against positive correlation between risks, insurers may raise premiums, possibly to prohibitive levels, or even refuse cover entirely.

Another way in which insurers try to limit their exposure to highly correlated risks is by inserting *exclusion clauses* into policies which offer cover against loss from a range of causes. An important current example in the UK is subsidence of the land on which buildings stand, which is now widely the subject of exclusion clauses in property insurance policies. Subsidence became an increasing problem when extremely low rainfall in some years in the early and mid-1990s significantly depleted amounts of water contained in the ground under buildings in many localities, leading to shrinkage and shifting of the subsoil and movement in foundations (with consequent structural damage to buildings). Insurers have responded to this experience by redrafting the terms of policies in ways which significantly restrict their liability to pay compensation when subsidence occurs.

The likelihood that adequate insurance will not be available to protect people against catastrophe risk<sup>12</sup> suggests that, as a device for protecting members of society against the consequences of adverse events, insurance has some major limitations. For risks are no less serious for being highly correlated. On the contrary, highly correlated risks are arguably often the *most* serious kind, since they can inflict massive losses on whole communities at the same time – witness the effects of

#### Exercise 2.4

Read the article in Box 2.2. Insurers give the name 'catastrophe risk' to some situations in which there is a high positive correlation between claims experiences on different exposures.

Can you explain, in terms of catastrophe risk, why insurers are responding to the increasing risk of flood in the way the article describes?

Why might damage caused by such events as war, riot, civil commotion also be subject to exclusion clauses in household policies?

<sup>12</sup> A concept explored in Exercise 2.4.

**Box 2.2 Insurers threaten flood cover**

Paul Brown, environment correspondent

British insurers are threatening they will withdraw flooding cover from about 220,000 homes if the government cuts the spending on flood defences as part of Treasury economies.

Britain is unique in Europe in offering universal flood insurance but companies, having paid out £5bn in the last five years – twice as much as in the previous five – believe it may no longer be viable to do so.

Following the disastrous floods of 2000, the worst event in 300 years, spending on defences was stepped up by the government to cope with decades of neglect. Many of those affected were new houses built on flood plains without adequate defences which would be rendered unsaleable by withdrawal of insurance. Without insurance, most banks and building societies will not agree a mortgage, so only cash buyers would be able to purchase.

After the 2000 floods the insurance industry agreed with the government that it would continue to insure all properties for at least two years until the long-term intentions of the government on repairing and creating new flood defences became apparent. The government solved the problem by stepping up expenditure but is threatening to cut it again, now that there have been no serious floods for 18 months.

Jane Milne, head of household and property insurance for the Association of British Insurers (ABI) said ‘The average home in Britain spends £295 on household insurance including flooding. The average cost of a flooding claim is between £15,000 and £30,000. You do not need many flooding claims to eat up a lot of insurance premiums.’

The insurance companies believe that properties should be protected to the extent that flooding could be expected to return not more often than one in 75 years, in order to make insuring them a viable risk.

In a submission to Gordon Brown, the chancellor, the ABI says that despite the increased expenditure one in 10 of the 1.8m properties threatened by flooding will be in greater danger than the one in 75 year risk that companies have set. The association has told Mr Brown that it is prepared to continue covering those properties after that date if the Treasury continues its level of spending on defences, which will be £564 million in 2006.

The expenditure is enough to protect an extra 80,000 properties a year, so it will still take at least three years to improve the barriers of the most vulnerable properties, without any money being spent on repairing existing deteriorating defences.

Ms Milne said ‘It is not a threat to withdraw cover so much as a sound business decision that we cannot afford to take these risks. In the light of climate change we have to keep the risk of flooding under constant review.’

The submission to the Treasury comes just before the government’s Office of Science and Technology foresight programme this week releases its scenarios for the next 100 years on how Britain will cope with climate change and flooding.

Source: *The Guardian*, 20 April 2004.

major natural disasters like hurricanes. Yet those who suffer in such circumstances will often be denied the benefit of insurance precisely because of the catastrophic nature of the risk to which they are exposed.

Recently, a term has been coined to describe a situation in which economic or social conditions deny particular social groups benefits that the financial system offers: *financial exclusion*. The kind of exclusion that may arise when risks are catastrophic in nature creates a case for the *socialization* of some such risks, that is, for the government to take responsibility for providing compensation to victims out of public funds when losses reach high enough levels.<sup>13</sup> Such outlays

could be viewed as being financed by a kind of enforced premium charged to the community at large. However, note the key difference that, if compensation for loss is paid out of the public purse, the cost falls on individual members of society in proportion to their liability to pay tax, *not* according to their degree of exposure to risk of loss. This is at odds with normal insurance principles, according to which those who are most exposed to risk are required to pay most (in premiums). However, catastrophe risk is the problem it is precisely because normal insurance principles do not apply. Furthermore, it is by no means obviously fair that those members of society who are less fortunate

<sup>13</sup> Or, as suggested in the article in Box 2.2, for the government to bear the cost of reducing the risk of loss to levels acceptable to the private sector.

than most (i.e., those most exposed to risk of loss) should be expected to pay the most.

There is an international dimension to catastrophe risk. Evidence is mounting that the world faces greater exposure to natural disasters, such as floods, as a result of global warming. There is evidence, too, that the homes of the poorest within a given country's population are often concentrated in the areas that are most exposed to such risks. Normal insurance arrangements cannot be made to protect such people for reasons which should be clear. If they are not to be left to cope as best they can when disasters occur, socialization of risk, whether through governmental or charitable aid agencies, has a role to play.

#### (4) Non-homogeneous client groups

In our earlier illustration of the LLN, we implicitly assumed that the risk of burglary was identical for all policyholders. In other words, we treated the insurer's client group as if it were *homogeneous*. This was useful in that it helped to simplify the analysis in a way that enabled us to focus on essentials. But it overlooked the major problems that arise when homogeneity is not the case. As we now make clear, the nature of the problem produced by non-homogenous client groups depends critically on whether the insurer is or is not able to identify the material differences between clients that do exist.

We begin by looking at *identifiable non-homogeneous client groups*. It is unfortunately true that young drivers are particularly accident-prone. Any insurance company that did not differentiate premiums according to driver's age would soon find itself undercut in the market for mature drivers' business by other companies which offered this group lower premiums to reflect their lower risk. Insurers will therefore use their claims experience to divide a given class of clients into as many subgroups as possible. They will always be alert to new ways of doing so. For example, insurers increasingly exploit the opportunities inherent in the fact that addresses in the UK are differentiated by postcode,<sup>14</sup> something which in effect subdivides the population into tiny, readily identifiable, geographical subgroups.

The ability of insurers to differentiate between subgroups within a class of policyholders can be something of a mixed blessing. On the one hand, it enables insurers to match premiums more closely to an individual's liability to incur loss. On the other hand, it can seriously limit the social usefulness of insurance in some circumstances. Consider the position of the chronically sick and disabled, who are particularly exposed to health-related risks, or of inner city communities, who face particularly high crime-related risks. Both subgroups are readily identifiable by insurance companies, which, when requested to provide cover to members of them, will quote higher-than-normal premiums (which may make them prohibitively expensive) or even refuse cover altogether.

Financial exclusion of this kind was one of the factors which gave rise to the system of *National Insurance* that has existed in Britain over many decades. It offers some protection against the adverse financial consequences of unemployment, sickness and old age but is not strictly speaking insurance since contributions are uniform or income-dependent and not related to risk.

In the future, genetic testing looks set to become an unprecedentedly powerful prognostic tool, making it possible to examine an individual's DNA structure to determine his or her degree of predisposition to a wide range of diseases, conceivably even at birth or in the womb. The scope for differentiating between high- and low-risk clients that genetic testing potentially offers insurers could have some profound and surprising consequences. A moratorium on the use of genetic tests results is in operation until 2006. However, as genetic testing becomes more sophisticated in the future, the temptation on insurers to make it compulsory will grow. Some individuals could then in effect be born uninsurable across a wide range of health risks. That could in turn lead to a demand for some kind of social insurance provision, which would be the only viable option for such individuals.

In fact, genetic testing might eventually allow insurers to differentiate so finely between subgroups amongst their prospective clients that business in some classes of private health insurance could become

<sup>14</sup> Where the first half, and first digit of the second half, of the postcode of a group of UK addresses are the same, the addresses concerned are said to be in the same *postal sector*. There are some 9,200 of these in the country as a whole. Insurers have sought to differentiate clients by postal sector for many years. However, advances in IT are making it increasingly possible for insurers to analyse their claims experiences in a far more detailed way by using the whole postcode. There are more than 1½ million different postcodes, each containing about 15 addresses.

### Box 2.3 Discrimination and adverse selection in insurance

#### (a) Discrimination in insurance policies

Consider these two statements. As men are more dangerous drivers than women, they should pay more for motor insurance. Someone who is found to be genetically predisposed to a certain illness should not pay a higher premium for life insurance. Seemingly inconsistent, they reflect the status quo in Britain. The policies are also right but have recently been questioned.

In Brussels, Anna Diamantopoulou, the European Union's employment and social affairs commissioner, has produced draft legislation banning sex discrimination in insurance. And the Department of Health yesterday published a white paper on genetics, which mused about genetic testing and insurance. While the white paper judiciously recognised the inherent, difficult trade-off between outlawing discrimination and ensuring a viable insurance industry, the draft legislation from Brussels did not.

The underlying principles are the same. Sexual discrimination is ethically repugnant and has been outlawed in many areas. The government also accepted that 'a core ethical principle . . . is that no one should be unfairly discriminated against on the basis of his or her genetic characteristics'.

But in applying the principle of non-discrimination to insurance markets, public policy must have regard to the importance of asymmetric information. If customers choose insurance on the basis of private information, the market will be distorted and, in the extreme, can cease to exist. To avoid this problem of adverse selection – that only the worst risks want to buy insurance at the price offered – insurance companies segment the market into broad risk groups.

For gender, this is simple. A person's gender is rarely in doubt and the broad risks are well known. Women are safer drivers so pay less for motor insurance, but live longer so receive lower retirement annuities. Society would lose if insurance companies were forced to be blind to gender.

With genetic testing, things are much more difficult. First, genetic tests have the potential to identify the risk of a specific individual's developing a particular disease – which could make him or her uninsurable. People could be excluded from getting a mortgage or protecting their family against their death. Second, forced disclosure of test results could inhibit some people from taking the tests, to the detriment of public health. Third, the relevance of genetic tests remains difficult to interpret for insurance purposes.

The current voluntary insurance industry moratorium on using genetic test results for life assurance policies up

to £500,000 is therefore sensible. Some time after 2006, it may be the case that the combination of risk pooling and widespread genetic testing becomes incompatible. That point has already been reached as regards gender. Sex-neutral insurance policies would create great adverse selection, would not deal properly with discrimination and must not be introduced.

Source: *Financial Times*, 25 June 2003.

#### (b) Where ignorance is bliss

A genome is not a horoscope. Destiny is not DNA. With the exception of a few, very rare diseases, causes of death are not genetically determined and neither are courses of life. Everything else the genome tells us is a matter of probabilities. But our knowledge of these probabilities is improving all the time, thanks to the knowledge and technologies brought about by the human genome project. Tests are becoming widely available which will make it possible to distinguish much more finely which probabilities apply to individuals. This is information which could be worth a great deal not just to the people directly concerned, but also to their insurers, their employers, those who pay their pension funds, and even the general public.

So why has the Human Genetics Commission proposed a law that would in principle ban discrimination on the grounds of genetic makeup and why is this such a good thing? One answer lies in a paradox. Insurance benefits from knowledge, but it depends also on ignorance. If we had complete knowledge of outcomes, life insurance would be impossible. Those whose genetic constitution promised long life would not buy it, and no one would sell to those who really needed it. Something like that is already happening in America, where health insurance is increasingly a privilege of those who do not need it. So there is a clear benefit to society in ensuring that insurance is available to everyone, especially in a society like ours, where the ability to own a house is dependent on getting an insurance policy along with your mortgage.

Another reason is that the knowledge gained from genetic testing will be multiplied the more people are tested, precisely because it is a knowledge of probabilities and statistical effect. So nothing must be done that might make people fear the consequences of being tested. But the most important reason is a moral one. What the commission proposes is a statement of a human right, one to which everyone should be entitled by virtue of being human. That is why it should be incorporated into legislation.

Source: *The Guardian*, 18 May 2004.



impossible. For, with the results of such tests routinely available to insurers and applicants, the former would, as just noted, be reluctant to offer cover to those of the latter who would most strongly desire it, i.e., those whom tests showed to be at high risk. On the other hand, the clients insurers would most like to have – those shown to face low health risks – would have little reason to seek insurance! In such circumstances, insurers would only be able to obtain business they did not want and they might well find that their technologically advanced techniques had caused the business they did want more or less to dry up.

This futuristic scenario would constitute a case of what insurers call **adverse selection**.<sup>15</sup> To explore this important concept more fully, we refer once again to our burglary example and show that, when differences exist within insurers' client groups that insurers are *unable* to identify, the problem of adverse selection is particularly serious. Note that we are dealing here with *non-identifiable non-homogeneous client groups*.

In our earlier example, the reader will recall, burglary on average affected 1 house per 100 each year and each burglary resulted in a loss amounting to £2,500, so that  $E(\text{loss}) = 0.99(0) + 0.01(2,500) = £25$ . Our insurer had 100,000 clients. Suppose now that half of these households were in a high-risk category (with a 3 in 200 chance of suffering a burglary in any year), while the other half were at low risk (only 1 chance in 200 of loss). Notice that the expected loss of a household will now depend on whether it is in the high- or the low-risk group. For the high-risk group, expected loss equals  $0.015(2,500) = £37.50$ , whereas for low-risk households  $E(\text{loss}) = 0.005(2,500) = £12.50$ .

If we assume for simplicity that the burglary risks faced by different households are uncorrelated, what premium will the insurer need to charge to cover expected claims, assuming all households pay the same premium? Clearly, the premium required will need to be equal to the average expected loss of high- and low-risk groups combined, i.e.,  $\frac{1}{2}(37.50) + \frac{1}{2}(12.50) = £25$ . Now the example has been designed to produce a figure that is the same as if all households faced the same degree of risk. However, when clients fall into high- and low-risk groups, charging all policyholders a standard premium that reflects the average degree of risk may be fraught with difficulties for the insurer.

For example, suppose that differences in lifestyle determine whether a household is in the low- or the high-risk group. Some families, for example, rarely leave their homes unoccupied and some are very careful about locking up when they go out or go to bed. Others are rarely at home and some are extremely careless about their domestic security arrangements. In all these respects, individual behaviour will influence the level of burglary risk a household will face. However, the situation may well represent one of asymmetric information. Householders will, of course, be aware of their own lifestyles and therefore be in little doubt themselves as to whether they are in the high- or the low-risk category. But it might be very difficult for insurers to obtain reliable information on the habits of different households.

Without a reliable way of differentiating between policyholders, our insurance company may be tempted to charge a uniform £25 premium. High-risk householders would be likely to regard this rate as a bargain and flock to insure themselves: after all, they know that their expected loss if uninsured is as high as £37.50. However, a household in the low-risk group may take a very different view. Knowing that its expected uninsured loss is only £12.50, it may consider a premium of £25 as exorbitantly high and, even if it is risk-averse, it could well decide not to take insurance. As a result, charging a standard premium could leave the insurance company dangerously exposed to adverse selection – plenty of high-risk customers and relatively few low-risk ones. With this imbalance in its clientele, it will be likely to experience average claim levels higher – possibly a lot higher – than £25, and its solvency will be threatened.

There are a number of ways in which insurers may be able to protect themselves against adverse selection. For example, companies will engage actively in risk screening, that is, using past experience to identify as accurately as possible characteristics (e.g., age, occupation) which will add to or diminish the likelihood that a policyholder covered against a given risk will incur losses and make claims. Individual applicants will then be charged a premium appropriate to the category to which the insurer believes they belong. However, past claims experience must be accumulated *before* risk screening can become possible. Until

<sup>15</sup> As the two contrasting articles in Box 2.3 illustrate, developments in genetics are leading to calls for discrimination on grounds of genetic make-up to be banned, which have in turn prompted concern that such a ban would expose insurers to adverse selection of a closely related kind.

then, the insurer would be unable to identify good and bad risk characteristics and could remain exposed to adverse selection.

The same kind of difficulty arises when insurers offer reduced premiums in the form of no-claims discounts to policyholders who have rarely, if ever, made claims in the past and who are, on that basis, regarded as being of low future risk. No-claims discounts would be most effective if the insurer could carry on doing business with the same clients year after year. However, all existing policyholders eventually ‘pass on’ and the company will need a flow of new applicants to take their places. If accepted, some new clients will, of course, turn out to be good risks. However, with no past record to go on at the point of initial application, the company may have no way of telling which applicants are in this category and therefore no reliable method of attracting them with offers of reduced premium rates.

By sharing information, insurers can in practice reduce the need to accumulate past experience of their own and as a result make more extensive use of risk-screening and no-claims discounts. For example, British insurers have access to CUE (the Claims and Underwriting Exchange), a computer database of general insurance claims and individuals’ claims profiles.

Some other devices for discouraging or reducing the cost of adverse selection do not rely so critically on the accumulation of past data. For example, policies of many kinds contain restrictive clauses which exempt the insurer from liability when the policyholders’ behaviour may have been a significant factor leading to loss. Thus, some home protection policies will not compensate householders for burglary losses in the absence of evidence of forced entry (which would indicate that the householder concerned had not taken the reasonable precaution of locking all doors and windows). Similarly, standard holiday insurance policies do not cover ‘hazardous pursuits’ such as skiing and mountaineering.

As well as responding negatively to the threat of adverse selection in these kinds of ways, insurers can also respond positively by trying to promote behaviour that will reduce the incidence of loss. For example, property insurance policies frequently offer

discounts on the standard premium to policyholders who have fitted specified security devices.<sup>16</sup>

Insurers sometimes also impose ‘excesses’, that is, they insist that the policyholder meets the first £*x* of any claim him- or herself. The existence of an excess is in itself a negative response to the problem of adverse selection, for it is a device for making high-risk clients bear more risk themselves. However, excesses become a more positive kind of response if they are voluntary and accompanied by the offer of reduced premium rates to policyholders willing to accept them. For they then turn into a technique by which an insurance company can hope to make its policies more attractive to a low-risk clientele and to promote loss-reducing behaviour amongst policyholders. Once again, voluntary excesses will ‘work’ for an insurance company even if it does not know which clients are low risk and which high risk.

#### (5) The effects of insurance on the behaviour of the insured

Suppose an insurance company gathers information about the experience of burglary among uninsured people and discovers that, as in our earlier example, the risk of burglary in any one year is 1 chance in 100, with an average loss of £2,500 if burglary does occur. Suppose it then begins to provide cover against burglary, charging a premium equal to expected loss of uninsured households, i.e., £25 per annum.

Now a company which, like this one, based premiums on the record of loss among uninsured people may find that these are insufficient to meet claims as a result of the phenomenon of **moral hazard**. This problem arises because once individuals are insured they may take less care to avoid loss, simply because they know that, should a loss be incurred, the insurance company will ultimately bear the cost. Even worse, they may do things which increase the size of their exposure. For example, they may acquire more valuable possessions, comforted by the knowledge that they will receive compensation in the event of loss.

It follows that, in practice, insurers will need to set premiums at above the average uninsured loss level or find ways of reducing the problem of moral hazard, or both. Fortunately, techniques available to help insurers

<sup>16</sup> It would be enormously expensive for an insurance company to check that all policyholders who claimed to have fitted the devices in question were telling the truth – part of the problem of asymmetric information. However, it would not really need to do so. It could instead simply make checks only when policyholders made claims and then refuse to pay out when these revealed that false information had been provided.

cope with adverse selection, risk screening, no-claims discounts, restrictive clauses, discounts for loss-reducing behaviour, excesses and so on, will also tend to be useful in helping them deal with moral hazard. The reader should make sure he or she understands why.

Finally, we must consider the question: *is insurance affordable?* An obvious but important fact about insurance is that it is only useful to the extent that potential users can pay for it. This is often not the case, a point touched on earlier in our discussion of natural disasters. We have noted also that some social groups in this country, for example, the irregularly employed and the chronically sick, are in particular need of the protection afforded by some types of insurance but will in many instances find it difficult to obtain cover. The problem for such people is often compounded by the fact that, even if cover is available, their situation means that they are on low incomes and therefore cannot afford its cost – double financial exclusion.

A case in point is the healthcare system of the USA, which is based predominantly on private insurance and from which tens of millions of citizens are excluded by their low incomes or employment situation. Indeed, the existence of the National Health Service in the UK can be understood in part as a response to this limit of the insurance principle, namely that insurance works only if those who face the risks can afford to pay for cover.

### 2.4.3 Pension systems: what are they and why have them?

We now turn our attention to pension funds, the other major class of NDTI identified earlier. These institutions operate as part of a **pension system**, and in order to begin to understand the principles governing their operation, we need first to say something about what a pension system is and why (if indeed at all) it might benefit society to have such a system.

#### What is a pension system?

A pension system may be briefly defined as a framework of arrangements, based on statute or private contract or both, under which individuals gain specified entitlements to a regular income in retirement (a pension) in return for the payment of specified sums (contributions) made by themselves or their employers during their working lives.

Notice that the system could, at one extreme, be an entirely voluntary one, in which individuals freely entered into contracts committing themselves to making payments to intermediaries and the latter, in turn, committed themselves to financing the payment of pensions on specified terms when the individuals eventually retired.

At the other extreme, a pension system might be compulsory and government-operated: workers and perhaps employers too might be legally obliged to make payments to the state (such as national insurance contributions in the UK) and the state might commit itself to paying pensions directly to retired individuals according to rules laid down in statute.

Systems representing all kinds of intermediate positions between these two extremes are possible. For example, the law might *require* employees and employers to enter into pension contracts with financial intermediaries whose terms were specified by statute. Workers and firms might be allowed to contract with any intermediary approved by the government, i.e., they might be given a choice *between* intermediaries. However, they would be obliged by law to enter into a contract of the prescribed kind with one such organization or another. Such a system would thus be based on compulsion even though no money passed through the government's hands at any stage. Alternatively, the system might be such that employers voluntarily entered into contracts with financial intermediaries (or made internal financial arrangements) with a view to providing pensions for their employees on retirement, but obliged their workers to accept such arrangements, including making contributions from salary, as part of the contract of employment.

#### Why pensions?

Now that we have defined what we mean by a pension system it should be apparent that it is not something that will necessarily exist in all countries at all times. For, in the absence of a pension system, individuals could still provide for their old age by accumulating savings during their working lives and then financing their needs during retirement by spending the income (dividends, interest etc.) generated by their capital, by gradually drawing on it ('dissaving') or both. Given that this is possible, is there any reason why a pension system should be needed at all? We can perhaps usefully subdivide this question into two:

- 1 Does a pension system of a purely voluntary kind offer any advantages to individuals who wish to provide for their old age?
- 2 Is there any case for state intervention in relation to the financial provision made for the elderly?

Considering the first of these sub-questions, we should immediately note that trying to plan for one's retirement in the self-sufficient kind of way just described poses a serious financial problem. For, if I wish to fund my old age by spending the returns my capital generates and by gradually drawing it down, I must plan to have the right amount of savings at the point of retirement to allow me to do so. But to plan that, I must accurately forecast my lifespan. Now, to stay alive on this Earth as long as possible is a more or less universal human desire, but what if I live longer than I had forecast when I formulated my life savings plan? Put bluntly, my funds may come to an end before I do! We are referring here to the problem of *longevity risk*, namely the risk that I may live longer than expected(!) and may therefore have run down my capital so far while still alive that it does not afford me a satisfactory standard of living throughout my lifetime.

An obvious advantage of a pension system, even one based purely on voluntary contracts, is that it may help to overcome this problem. Suppose that, instead of accumulating capital on my own account, I enter into a contract with an intermediary under the terms of which I make payments before retirement and in return am guaranteed a regular income throughout my lifetime, *however long that turns out to be*. Such a contract would effectively eliminate my longevity risk.

How could such a contract be financially viable from the point of view of the intermediary? The answer is that, if it can persuade a large group of individuals to enter into contracts of this kind, it can hope to exploit the LLN to ensure that the longevity risk thereby removed from the shoulders of individuals concerned is not simply transferred onto itself. For, given reliable enough data on life expectancy and suitable actuarial skills, it can set the payments it requires an individual to make at the right level to ensure that they will be sufficient to finance the pension payouts made to a person who lives an average lifespan. Now, of course, some individuals to whom the intermediary is contracted will

live longer than others. But, with a large enough client base, it can expect that the long stream of payments it will have to make to individuals who live to a ripe old age will be offset by the much smaller total payouts made to those who are not so fortunate. One arguably distasteful but nevertheless essential feature of pension schemes financed by contributions is that those who die young subsidize those who live on!

Even if I could forecast my lifespan accurately, trying to finance my retirement in a self-sufficient way by accumulating my own savings would also expose me to *investment risk*. For in deciding how hard I would need to save during my working life in order to ensure the standard of living I desired in old age, I would need to forecast the rate of return my savings would earn as they accumulated before I retired as well as the rate of return my capital would earn afterwards. If, as things turned out, I had overestimated either my pre- or my post-retirement returns, I would discover – too late to do anything about it – that I had not saved hard enough!

I may be able to reduce or even eliminate this investment risk by entering into a pension contract with an intermediary of the kind already described. Once again, any reduction in risk that arises will be due to the scale of the intermediary's operations, which will enable it to hold a more diversified asset portfolio than any individual will be able to achieve and to cover the costs of more expert fund management than an individual is likely to be able to afford.<sup>17</sup>

Longevity and investment risk suggest reasons why individuals might choose to participate in a pension system of a purely voluntary kind. They do not in themselves, however, justify the involvement of the state in financial provision for the elderly. We now turn to consideration of a range of other factors which, in the view of many observers, do suggest grounds for government intervention of one form or another in this area.

### Adverse selection

One way in which I could act individually to avoid longevity risk is by buying what is known as a **retirement annuity**. This would involve me in using some or all of my savings to make a lump sum payment to an *annuity provider* at the point of retirement. In return the latter would agree to pay me a regular pension

<sup>17</sup> In some circumstances a pension scheme will be capable of transferring risk away from the individual at the point of retirement. See the discussion of defined benefit *versus* defined contribution pension schemes in Section 2.4.4 below.

**Exercise 2.5**

- (a) If someone purchases a lifetime annuity on retirement, does longevity risk disappear or is it transferred? Explain your answer.
- (b) Who would be more likely to purchase such an annuity: Mr X, whose life expectancy is short because of a medical condition he has developed, or Ms Y, whose family tends to live to a ripe old age? Why?

(Answers: Part (a), see end of book; part (b), this page.)

(the annuity) for the rest of my life. Exercise 2.5, to which the reader should now turn, is intended to highlight a major drawback of a voluntary arrangement of this kind.

Because of his medical condition, Mr X could expect to receive only a short stream of pension payments if he purchased the annuity. To put the same point a little more technically, the annuity would represent poor value for him because his longevity risk is low. The standard of living he could expect to enjoy over his expected short life would be likely to be higher if he invested his money on his own account for the time being, rather than paying it over to the annuity provider, and subsequently spent it as he wished. Exactly the opposite is true for Ms Y, however. Her longevity risk is high and the annuity for her would be likely to be an extremely good buy.

It should be clear from our comparison of the positions of Mr X and Ms Y that an annuity-providing intermediary in a voluntary system would face a major adverse selection problem. It would welcome clients like Mr X since the lump sum payments it would receive from them would be likely to be large in relation to liabilities it would incur in return. But the intermediary will find it difficult to attract the likes of Mr X. On the other hand, clients like Ms Y would be distinctly unattractive to the annuity provider, since they would bring formidable liabilities with them relative to the lump sums they would pay. However, conscious of the high levels of longevity risk they faced, they would be the first people at the intermediary's door demanding to be allowed to buy a pension.<sup>18</sup>

It follows that a purely voluntary pension system might never get off the ground, since, as a result of adverse selection, intermediaries might not find it financially viable to offer pension annuities. As a result there would be market failure: the financial system would be incapable of fulfilling the function of helping individuals overcome the longevity risk that they would face if left entirely to their own devices in the matter of providing for old age. The possibility of market failure of this kind suggests a first argument for state involvement in pension provision. Only if the state *obliged* people to purchase pension annuities might it be financially viable for intermediaries to provide them. If that is true, an element of state compulsion might be viewed as desirable as the only practical means of ensuring that protection against longevity risk was made available.

### Financial 'myopia'/improvidence

The future is uncertain, and each of us only gets old once (if at all). Providing for old age is therefore not something we can learn to do from personal experience, particularly since we will not have a chance to learn from our mistakes. It follows that individuals left to their own devices may fail to save sufficiently before they retire. They may not be far-sighted enough to see a need to do so. Or they may just be plain improvident: they may decide to enjoy the present and to let the future take care of itself. Whether myopic or improvident, by the time the individuals concerned have discovered the error of their ways (which may not be until old age has arrived) it may be too late.

If it is accepted that a civilized society cannot simply allow individuals who have been 'feckless' in their younger days to live in destitution in their old age, then some state-initiated system to provide pensions for them is required. In fairness the benefits of such a system would probably have to be extended to everybody else. The costs of the system could conceivably be met out of taxation, which would immediately introduce an element of compulsion. Furthermore, it is likely that some people will save less for themselves if they believe the state will provide for their financial needs in retirement. If it is thought desirable that society should be protected against this form of moral hazard, compulsion of a more direct kind will be necessary:

<sup>18</sup> Notice the contrast with life insurance. Life insurers welcome long-lived individuals and are chary about providing cover to people with known medical conditions that may shorten their lives. For pension providers, everything is reversed!

future beneficiaries will have to be required to make contributions towards the cost of the pensions they will in due course receive. At the same time, even if the principle is accepted that citizens should be made to pay in a direct way for the pensions they will receive, it is not necessary for the state to have any involvement in the actual financing of pensions. Individuals could pay their contributions to private sector intermediaries during their working lives and the latter could in turn pay the former their pensions after retirement. The state's role would then be restricted to using its power to require citizens to enter into these financial arrangements and to providing a regulatory framework for them.

### Poverty alleviation/redistribution

Even though they may be neither 'myopic' nor improvident, people in some social groups may not save enough for their old age because they simply have not been able to afford to do so. For example, they may have experienced a lifetime of poorly paid or casual jobs or else their careers may have been interrupted significantly by sickness, family responsibilities or unemployment. If *all* sections of society are to enjoy an adequate retirement income, deliberate provision will need to be made for people in this (possibly) large category. Such arrangements are also likely to result in a redistribution of income and wealth towards the poor, something that will be regarded as desirable if it is felt that market economies tend to produce unfair and random economic inequalities.

To the extent that the purpose of a pension system is poverty alleviation or redistribution, it would obviously be inappropriate for its beneficiaries to be expected to meet the costs of the pensions they are intended to have. Since that is so, designing a pension system with objectives of these kinds but based on financial contracts between individuals and private-sector intermediaries is likely to prove problematic. This points to one of the dilemmas surrounding the so-called 'stakeholder' pensions recently introduced by the UK government.<sup>19</sup> These are intended to enhance the living standards in retirement of poorer sections of the community who have not hitherto enjoyed the benefit of occupational pensions. Yet the stakeholder pension is an essentially private arrangement by which a portion of a worker's salary is deducted at source

and paid into a pension fund that will ultimately have the responsibility of paying a pension reflecting the size and quantity of the contributions he or she has made. So the stakeholder pension does not shift the burden of providing for old age from the poor or relatively poor intended beneficiaries – unless employers also contribute to workers' pension funds.

### Social solidarity

A further related justification for having a pension system derives from the motive of social solidarity. As members of the same society, we will have a concern for one another's wellbeing and will also recognize the latter stages of life as a period when individuals are particularly vulnerable. We may therefore feel it right to offer one another collectively some kind of assurance that, regardless of financial circumstances or choices made earlier in life, old age, should we reach it, will be a time of financial security. In that case, our feelings of social solidarity are likely to lead us to wish to ensure that a pension system exists capable of guaranteeing everyone an acceptable standard of living in retirement.

Note that a pension system motivated by social solidarity could take many forms. It might be state-operated and financed out of taxation. Equally, however, it could be based on a legal framework which ensures a level of contribution to private-sector pension schemes that enables the intermediaries responsible for their operation to offer a standard of pension provision high enough to meet society's expectations.

Clearly, pension systems can differ widely in their design and characteristics. In the next section, we examine some key differences and consider their implications for pension funds in particular.

## 2.4.4 Characteristics of pension systems

Pension systems can be distinguished according to the principles on which they:

- are financed, that is, how benefits are paid for;
- determine the entitlement to benefit of different individuals.

These differences and their implications form the focus of the discussion for the remainder of this chapter.

<sup>19</sup> Stakeholder pensions are discussed further in Section 3.5 below.

## Financing pensions: ‘pay-as-you-go’ and ‘funded’ schemes

The UK state pension scheme is financed on a **PAYG** (‘pay-as-you-go’) basis: national insurance contributions received from *today’s* generation of workers go to pay the pensions of *today’s* retired generation. In a significant way, this arrangement reflects underlying economic reality. Suppose I want to ensure that I have bread to eat after I retire. During my working life I could, for example, build an oven in which the bread I will eat after retirement will be baked. This would be a *real* equivalent of saving for my retirement. However, even though I can provide myself with real capital for my old age in this way, I can only eat as a pensioner if the next generation of workers does the work needed *at that future time* to bake the bread I will eat and grow the wheat from which it will be made. In other words, since the current labour of others is always needed to support the generation of pensioners that is alive at any point in time, it is true to say that the latter are in a real sense maintained economically on a pay-as-you-go basis by the current working population, *however their living costs are paid for*.

Notwithstanding these considerations, PAYG is an unsuitable basis for financing the occupational pension schemes<sup>20</sup> operated by individual firms in the private sector for two main reasons:

- 1 if the workforce of a private firm diminishes over time (e.g., because the business is declining), its pensioners could outnumber its current workforce so greatly that current contributions into the firm’s pension fund do not cover its current liabilities to pay pensions;
- 2 the firm may cease trading, leaving pensioners (and employees hoping for a pension in the future too) unprovided for.

State-financed schemes, whether operated to provide pensions for public sector employees or the general population, do not face these particular problems and, in any case, the state could in principle always levy taxes (or ‘print’ money) to make good any funding shortfall. However, state provision is under threat in the UK and many other relatively rich countries because

of the twin demographic implications of (i) rising life expectancy, which implies an expanding pension population, and (ii) stagnant or declining numbers of people of working age to provide for their own and everybody else’s needs.

These two developments together mean a rising **dependency ratio**, defined as the ratio of economically dependent people to those who support them.<sup>21</sup> This, it is widely feared, could mean steep increases in taxation for the working population that could impact badly on the living standards of workers and their families, especially if economic growth is weak, and produce disincentive effects that could have adverse effects on economic growth.

Set against this it should be recognized, however, that in increasingly wealthy communities there is scope for increasing the level of taxation without actually reducing living standards. In other words, even if some of the benefit of economic growth is taken away from today’s producers in extra taxation, they may still be left with sufficient gains to enjoy a gradually rising standard of living. Secondly, it should be noted that the spending capability pensions offer to the retired community may help to stimulate aggregate demand and, in particular, demand for labour-intensive services (personal care, for example). This could be genuinely beneficial in an era when technological advances are causing labour to be shed in many sectors of the economy.

For the reasons outlined above, UK law requires private occupational pension schemes to be fully funded. The underlying principle of a **funded** scheme is that each generation of workers finances itself. But the current generation of workers belonging to any scheme is still in the process of making contributions and will only draw pensions in some future period. How can we tell whether it is truly succeeding in financing its own future pension provision? The answer is that we have to compare the current asset and liability positions of the pension fund in question, something which is complicated by the long time spans involved.

The contributions already made by workers who have yet to retire will give them rights to future pension payments as determined by the rules of the scheme. These, together with the obligations to pay pensions

<sup>20</sup> Recall that occupational pensions and the role of pension funds in providing them are briefly outlined at the beginning of Section 2.4 above.

<sup>21</sup> The elderly are a major economically dependent group but not the only one. The very young (those below working age) are also economically dependent, as are those who are unable to work through severe illness or disability.

to former workers already in retirement, represent the currently accrued liabilities of the fund. Note that they are liabilities to make payments at a succession of dates stretching into the (fairly) remote future. Note also that if the scheme's estimate of its own future liabilities is to be reliable, it needs to forecast accurately the average longevity of its current and future retired scheme members.

On the other hand, the present assets of the fund equate to the sum of all contributions received to date *plus* all returns gained as a result of investing these *minus* all monies so far paid out in pensions. These are available to meet future pension payouts and, in the meantime, to invest with a view to acquiring additional assets in the future that will also be available to finance the payment of pensions.

For a scheme to be fully funded, the total of its present assets must be sufficient, given projected rates of return on future investment of these monies, to ensure that all liabilities that have so far accrued to pay pensions in the future can be met as they fall due. The scheme's actuaries will be concerned particularly with the validity of assumptions made about longevity rates and projected rates of return on the future investment of funds held by the scheme. If they are satisfied with the reasonableness of these assumptions then the fund can be said to be *actuarially sound*. Clearly *actuarial soundness* is a key requirement for a fully funded scheme.

Factors such as those identified in Exercise 2.6 could present a risk that an occupational scheme might at some point in time become underfunded. That would cast doubt over its ability to pay the full rate of pension due to its retired members, present or future. So long as there is a chance that a scheme could become underfunded, its members thus face what is in effect an investment risk. The reader should recall that the reduction of investment risk was one of the justifications put forward earlier for the existence of a pension system.

If a scheme appears underfunded, the pressure will be on the employing firm, in the first instance, to step up its contribution rate so as to remedy the situation. If the degree of underfunding is so great that the additional need for contributions from the employer would be excessive, the current generation of workers might also be required to make higher contributions. Either way, the current generation of pensioners is completely protected against this investment risk. Currently working members are also fairly well protected, since

### Exercise 2.6

Suppose the pension scheme of a given firm is fully funded at the present time. How, if at all, will the following changes affect the financial state of the fund?

- (a) an increase in the rate of benefit paid to retired members;
- (b) a decrease in the contribution rate paid by workers or by the employer;
- (c) an increase in the life expectancy of retired members;
- (d) a decrease in the profitability of the fund's investments;
- (e) an increase in labour turnover within the firm;
- (f) a round of redundancies before retirement within the firm;
- (g) an increase in the rate of inflation.

they will not have the primary responsibility for making good any funding shortfall.

The real threat to the financial security of both actual and prospective pensioners arises from the possibility that, at the point in time at which a state of underfunding has developed, the firm has ceased to trade. Now, in order that accrued liabilities can be met, a firm's pension fund is designed to carry on even if the firm itself closes down. However, suppose that after the firm's closure a significant fall in the projected rate of return on the fund's investments occurs. In such circumstances there would be no source of finance from which to top up the fund's assets and its trustees would find themselves with no option but to reduce the level of pensions members receive.

### Determining benefits

Having considered funding aspects, we now go on to examine the benefits side of pension provision. Essentially, schemes divide into two major classes in terms of the way in which benefits to be paid to members are determined: these are 'defined benefit' and 'defined contribution' (sometimes called 'money purchase') schemes.

**Defined benefit** schemes set down precise rules governing how much each individual will receive in pension payments. For example, the size of an individual's UK state pension depends on how complete his or her contribution record is.



Many occupational schemes are defined benefit schemes in which the individual's pension right is determined on a *final salary* basis. The pensioner receives:

- an annual pension equal to a specified fraction of his/her final salary (e.g., 1/80) for every year s/he has worked

and generally also

- a lump sum on retirement equal to a fraction (e.g., 3/80) of final salary for every year worked.

If I am a member of a defined benefit scheme, I can at any time make a reasonably reliable forecast of my pension income by working out how many years of service I will have achieved by the time I retire and estimating what my final salary will be. The characteristics of a defined benefit scheme, coupled with safeguards against underfunding already discussed, offer members of such schemes a high degree of security. The employer bears the brunt of any investment risk. It is true that, if benefits are defined in nominal (money) terms, the value of the pension can be undermined by inflation. However, in many schemes pensions are index-linked, so that the inflation risk too is borne by the employer.

These risk transfers obviously represent a disadvantage of defined benefit schemes as far as employers are concerned. However, they also possess a number of other limitations which should not be overlooked.

Without doubt, defined benefit schemes offer real security in old age to individuals who expect to clock up a long period of service with an employer and to be earning a reasonable final salary by the time they retire. However, many people will not be in continuous, reasonably well-paid employment. For example, some will suffer illness or unemployment, and many will have to interrupt their careers to care for children or elderly relatives. For people in these categories, the defining of benefits will not in itself be sufficient to ensure a reasonable level of pension entitlement.

Furthermore, although making pension entitlement dependent on length of service and final salary

### Exercise 2.7

Carl has worked for 23 years in a firm whose pension scheme is designed on an 'eightieths' basis. His salary in the year preceding his retirement was £26,400. What will his annual pension be and what lump sum will he receive on retirement?

### Exercise 2.8

Stuart and Barbara have both recently retired on the same pension from the company for which they have worked. This is because both received the same final salary and both had the same length of service with the company.

However, Stuart spent most of his working life on a lower salary grade and was promoted to the same salary level as Barbara only 18 months before retirement. Barbara, on the other hand, had worked at this higher grade for most of her career.

Is it fair that both should receive the same pension?

(Answer: this question raises a matter of personal judgement but, in thinking about it, the reader should bear in mind that over her career Barbara will have made much larger contributions to the company's pension fund than Stuart will have done.)

is intended to achieve fairness between members of a scheme, inequities such as that illustrated in Exercise 2.8 can arise.

Another issue of equity that arises out of the nature of defined benefit schemes is that people who change jobs frequently may lose out:

- There may be a minimum period of service before the individual's right to a pension becomes 'vested'. If he or she leaves the job before the end of that period he or she will have accrued no pension entitlement.
- Even if the right is vested, it will be frozen until the individual retires. If pension entitlement is fixed in money terms it is not protected against inflation. Even if it is index-linked, the individual remains at a disadvantage as it is likely that the Retail Price Index will rise more slowly than the salary he or she would have earned by staying in the company and to which the pension would have been tied.
- The individual loses the opportunity to enhance the value of his or her early contributions by achieving promotion at a late stage (consider Stuart's case in Exercise 2.8).

The economy looks set to be characterized by high job insecurity for the foreseeable future. Many people could therefore be disadvantaged by these features of defined benefit schemes.

The features of defined benefit schemes which give rise to these equity considerations may also have

implications for economic efficiency. Because they create a financial incentive for workers to stay with the same employer, they will tend to discourage labour mobility. As a result, staff turnover may be reduced and this may in some ways benefit firms and through them the wider economy. By the same token, however, defined benefit schemes will reduce labour market flexibility. This will tend to make it more difficult for growing firms, perhaps the most dynamic enterprises in the economy, to attract labour that they can use effectively. Economic growth could suffer as a result.

In view of the risk burden defined benefit schemes place on employers as well as the equity and the efficiency issues they raise, some commentators have suggested that it might be useful if they were widely replaced by *defined contribution* (otherwise known as **money purchase**) schemes. An example of the latter kind of scheme is the UK ‘personal pension’. Here the individual pays in contributions over his or her working life which are invested to produce a fund that is used when the person retires to buy an annuity payable for the rest of his or her life. The size of the eventual pension received therefore depends on:

- the value of contributions paid in – the individual may have some discretion over this;
- the returns earned on these contributions;
- the market rate for annuities at the time of retirement.

Note that, under a money-purchase arrangement, the worker will not know the size of his or her pension until the day he or she retires. Other aspects of defined contribution schemes are explored in Exercise 2.9.

### Exercise 2.9

- 1 Under a defined contribution scheme:
  - (a) who bears (i) investment risk, (ii) inflation risk, the employer or the employee?
  - (b) would the obstacles to labour market flexibility referred to above disappear?
  - (c) would adequate pensions be ensured for those in low-paid or irregular employment?
- 2 Should the government encourage a shift from defined benefit to defined contribution schemes?

## 2.5 Non-deposit-taking institutions – mutual funds

Mutual funds are, strictly speaking, *any* funds in which investors’ savings are pooled, on an equal basis, for investment purposes. In this sense, the insurance companies and pension funds that we have just been discussing could be regarded as mutual funds. However, the pooling of funds for investment purposes comes about as a side-effect of their main objective, which is to provide a particular kind of financial product. Thus the term ‘mutual fund’ is more commonly restricted to organizations for whom the pooling of investment funds is their primary business. The phrase is thus used to describe a fund of savings collected in order to exploit the economies of scale that exist in the transactions costs associated with trading in securities – equities, bonds or money-market instruments.<sup>22</sup> In a mutual fund, small savings are placed with a fund manager who uses them to buy, hold and sell securities with a view to achieving the objectives of the fund, which may be ‘growth’, ‘income’ or ‘balanced’ (a mixture of the two). Alternatively, the fund may concentrate upon particular sectors of the securities market (‘technology’, ‘special situations’, ‘smaller companies’) or upon particular geographical regions (‘Pacific’, ‘SE Asia’, ‘North America’). If the objective of the fund is primarily to generate income, it may invest exclusively in bonds or in money-market instruments (a ‘money-market mutual fund’).

In order to meet the costs of trading in the securities, the fund will make a small annual charge to investors and there may also be a charge for entering and leaving the fund. The benefits to investors, however, are that these charges are much smaller than they themselves would face if they tried to buy a similar portfolio of securities as individuals. This is because of considerable economies of scale in transaction costs – it costs no more to process a very large deal than it does to handle a small one – and this is reflected in brokers’ fees and commissions. Thus an individual buying, say £10,000-worth of shares in a company might find that s/he was paying, say, 3 per cent in fees, while a fund manager buying, say, £10m-worth might pay only 0.5 per cent. This in turn means that an individual would find it very expensive to build up a diversified portfolio, whereas,

<sup>22</sup> The term ‘mutual’ is also used to describe a particular form of ownership of a financial organization, one where ownership rests with the savers and borrowers. Amongst many examples are building societies in the UK (Chapter 3) and some banks in Germany (Chapter 5). This is quite different from the meaning of mutual here.

as a member of a mutual fund s/he can have a small share in say, 100 companies. Finally, there may be an advantage to unsophisticated investors with little knowledge and little time to increase it, in putting their funds with a professional manager and his or her team of analysts (though evidence discussed in Section 26.4 does not strongly support this).

As we said above, the term ‘mutual fund’ has come to mean a fund which pools savings in order to buy, hold and sell securities. A glance at the financial press in any developed country will reveal hundreds of funds available to savers, all offering the advantages of relatively cheap diversification. (Section 8.3 discusses these advantages.) Similar as all these funds are in their objectives, the structures which are used in order to achieve those objectives vary in detail between countries. However, there are two fundamentally distinct types of mutual fund and most countries offer both. Mutual funds can be either ‘open-ended’ or ‘closed-ended’.

An **open-ended fund** is one in which the size of the invested fund varies in response to two things. Firstly, the size of the fund varies with fluctuations in the value of the assets held by the fund. This is true to a greater or lesser extent of all mutual funds. What is special about open-ended funds, however, is that the flow of savers’ contributions to the fund will also cause a change in fund size. An inflow of savings causes the fund to expand while an outflow causes it to shrink. In the UK, such funds are known as ‘unit trusts’ or ‘open-ended investment companies’ (OEIC). There are differences in structure and in pricing practice (see Section 3.6) but neither of these concern us here. To understand how an open-ended fund works we need to understand the concept of a ‘unit’, since the inflow (or outflow) of funds causes a change in the number of units in existence but not their price.

Imagine an open-ended fund which is being created from new. The management advertises its intention to open a fund with specific objectives, let us say capital growth from shares in mainly US companies. They invite savers to invest as much as they wish (though this will usually be subject to some minimum amount, say £500) by a specified date. Let us assume that subscriptions amount to £100m. This is immediately invested in US shares with a small amount, say 5 per cent, retained as bank deposits. The fund is then divided into units with an arbitrarily chosen price. In the UK, an opening price of 50p is quite common. Fixing the price obviously fixes the number of units. In our example, the price of 50p means that 200m

units are created. These units are then allocated to savers in a quantity which matches the amount that they originally subscribed to the fund. The result is that the company has a portfolio of shares and ‘cash’ equal in value to the funds subscribed by savers and savers have a claim on this portfolio, represented by a number of units of 50p, which just matches what they subscribed. Now suppose that no additional funds are subscribed and no savers cash in their units. The value of the fund will vary *directly and only* with the value of the underlying shares. If the price rises such that the whole portfolio becomes worth £150m, then it follows that the value of each unit will have increased to  $£150m \div 200$ , or 75p.

Imagine now that new savers wish to join the fund and others wish to leave. On any particular day, units will have a price, calculated as we have just seen. New savers can buy units at this price while existing savers who wish to withdraw from the fund can sell units at the same price. Let us assume that, on balance, an additional £7.5m flows into the fund. The managers will create an extra 10m units credited to the new savers and invest the new savings in more US shares. The effect of the inflow has been to expand the size of the fund (by 10m units = £7.5m). The reverse would have happened in the case of withdrawals. Meanwhile, the value of the units will vary if, and only if, the value of the fund’s investments changes. In an open-ended fund, therefore, inflows and outflows from savers affect its size, not its value. Its value depends solely upon the value of the underlying assets.

By contrast, a **closed-end fund** is one whose size is unaffected by its popularity with savers. ‘Inflows’ and ‘outflows’ have no effect at all on the *size* of the fund and this is because strictly there can be no inflows or outflows to the fund itself. A closed-end fund is one where the fund is established by the savings originally subscribed and then the doors are closed. As with an open-ended fund, subscribers’ contributions are used to buy assets which reflect the objectives of the fund (‘income’, ‘growth’ etc.) and subscribers are once again given shares in the fund at a price which determines the number of shares in issue. What distinguishes the two types of fund is what happens next. Suppose that additional savers wish to join the fund, attracted perhaps by its objectives and the assets that it owns. Since the fund is closed, their savings cannot be added to the fund. If they wish to acquire a share in the fund, they have to buy existing shares, already held by other savers. With a closed-end fund, additional savings cannot

increase its size, they can only increase its value. Equally, people ‘leaving’ the fund cannot diminish the size of the fund – *they cannot withdraw their savings from the fund itself*. This structural difference gives rise to two further distinguishing features.

The first relates to the pricing of units or shares in the fund. We have seen that the value of units in an open-ended fund changes only when there is a change in the value of fund assets. By contrast, since joining and leaving a closed-end fund means buying or selling its shares, attempts to join and leave will affect the price of the existing shares. This means, therefore, that the value of shares in a closed-end fund can change for *two* reasons. First of all, the value of the shares will bear *some* relation to the value of the underlying assets. If the assets in which it is invested rise dramatically in price, for example, then the fund is more valuable and, other things being equal, the shares in the fund will also be more valuable. But for closed-end funds, other things may not be equal. The value of the shares in the fund will only rise if people see them as more valuable and wish to buy them at the price which reflects the value of the underlying assets. As a rule, we

may expect this to be the case but it *need* not happen, or it may not happen with precision. In fact, it is quite common for the value of shares in a closed-end fund to stand at a discount to the value of the assets in which the fund is invested. (We look at why this might be the case in Box 2.4). So, the second fundamental difference between an open-end and closed-end fund is that while the price of shares (units) in an open-end fund is determined exclusively by the value of the assets in the fund, the price of shares in a closed-end fund is determined by demand for the shares. The value of the underlying assets is relevant only in so far as it affects this demand. During the equity market recovery of 2003–04, the price of shares in most investment trusts lagged behind the general rise in the level of share prices and the discounts to net asset values widened.

The second difference between the two types of fund means that closed-end funds are, as a rule, cheaper to operate. This follows from the fact that savers’ decisions to buy or sell the shares have very little impact on the fund’s managers. Their job is to invest the funds originally subscribed when the fund was first established. If the fund becomes popular (and the

#### Box 2.4 Why do investment trusts trade at a discount?

Because the price of shares in investment trusts is determined by the demand for them, their price can deviate from the value of the underlying assets. One might expect such deviations to be short term and equally distributed between discounts and premiums. However, discounts are much more common and can go on for years (though varying in size). At first sight, this bias is curious and difficult to explain. Consider what it means. If an investment company owns shares whose current market value is £500m and the market value of its own shares is £450m, the discount is 10 per cent. A large investor, interested in the underlying shares then has a choice. He can either buy the shares in the open market for £500m or he can buy all the shares in the investment company for £450m, close the firm and keep the underlying shares, saving himself £50m. This looks like an anomaly which ought not to exist in a competitive, well-informed, market. The fact that the discounts persist suggests that shares held by an investment company are less attractive to would-be purchasers than the same shares bought in the open market.

There are several factors which explain the paradox. The first is that if a single buyer tried to buy up the shares of the investment company, it is very likely that the share price would rise and the discount would be eliminated, certainly once it became clear that a takeover was planned. The second is that the rate of return on shares owned by an investment company are bound to be less than they would be if held directly since the investment company has operating costs which have to be met from the return on the portfolio before the company’s shareholders can benefit. This is acceptable to ‘small’ investors because the charges are less than the costs they would have to face if they tried to create the same portfolio on a small scale. The same would apply to anyone who bought up all the company’s shares – its operating costs would still have to be met. However, any potential buyer of the investment company is likely to be another financial institution, or at least another company. Such a buyer would not be interested in paying for the management of the fund. The buyer would wish to sack the management and employees and hold the underlying portfolio directly. This eliminates the future management charges, but winding up the company would involve costs which would include paying compensation to the management and employees of the fund.

share price rises) that is of no direct consequence to the managers. In an open-ended fund, however, this popularity would mean an inflow of funds which would have to be invested. Likewise, with sales. If savers 'leave' a closed-end fund they merely sell their shares (whose price may fall). The fund itself is unaffected. In the case of an open-end fund, however, the managers will have to sell underlying assets in order to repay

### Box 2.5 Hedge funds

In 1998, 'Long Term Capital Management', a US-based mutual fund in which many financial institutions and wealthy individuals had invested, nearly collapsed. It sent shivers through world financial markets, such was its size, and caused the Federal Reserve to cut interest rates, leading to the allegation that the Fed was developing a new role – of lender of last resort to financial markets – to complement its traditional role of lender of last resort to the banking system. LTCM was widely referred to as a 'hedge fund'. The term hedge fund has since been applied to many other mutual investment projects, not all of which strictly merit the term.

The basic principles of a hedge fund were established by Alfred Winslow Jones, an Australian by birth but later a US citizen with a colourful and varied career, in 1949. A conventional mutual fund buys assets which it expects to give a good rate of return in some combination of income and capital gain. If the managers think that the assets are likely to produce a poor or negative return, their defence is limited to selling the assets and holding money instead. A hedge fund does the same but, crucially, it does four other things. Firstly, it simultaneously engages in 'short-selling', that is it sells shares it does not own but has only borrowed, in the expectation that it will be able to buy them later, when their price has fallen. Secondly, it borrows funds in order to buy assets in excess of the subscriptions that it has received from fund members. In other words, it employs 'gearing' or 'leverage'. Thirdly, there should be no explicit charge to members of the fund because the managers are paid a percentage of realized profits. Thus their remuneration has a strong incentive element. Finally, hedge funds are usually unregulated and are therefore free to deal in derivative instruments (see Chapter 20) giving them another source of gearing.

The basic idea behind a hedge fund, therefore, is to eliminate market risk (the fund's long holdings benefit when the market rises and the short sales show a profit if the market falls) and to make a profit by buying and selling the right stocks. We shall see, when we have studied Chapter 8, that the theory behind this is quite different from the theory that drives most conventional mutual funds. The conventional argument, used to justify the latter, is that one does not have enough information consistently to buy (sell) individual assets just before their price rises (falls) so that 'stockpicking' is highly risky and is unlikely to give a return which is better than holding a diversified portfolio. However, the added advantage of investing in a mutual fund is that it gives a high degree of diversification which eliminates the specific risk associated with individual assets, since good returns will offset poor returns. With sufficient diversification, the level of risk can be driven down to approximate 'market risk', the risk that the whole market may rise or fall. This level of risk is regarded as unavoidable. But a hedge fund is constructed in such a way that market risk is eliminated while the managers concentrate upon spotting 'undervalued' shares (which they buy) and 'overvalued' shares which they borrow and sell short. The icing on the cake is then to magnify the profits by gearing.

Following these principles, Jones died a rich man in 1989, but the secret had been revealed as early as 1966 and inevitably spawned many imitators. To begin with, hedge funds sought to attract only very large subscriptions so they were accessible only to institutions and the extremely wealthy. However, with stock markets generally falling during 2000 and 2001, retail fund management groups found it impossible to sell units in conventional funds. The idea that it might be possible to make a profit whichever way the market was moving thus became very attractive as a marketing device. These groups then began to offer 'hedge funds' scaled down for people to invest as little as £5,000. At the same time, it became apparent that the term 'hedge fund' was being misused in a number of these cases and regulators became worried that unsophisticated investors were being drawn into funds which they did not fully understand. The biggest worry is that some of these so-called hedge funds lack the short-selling element. This leaves them as highly geared conventional investment funds. They borrow money in order to buy and hold shares which they think will rise. Gearing increases the possible returns but it also increases the risk. It remains to be seen whether retail investors fully understand this risk and how they will react when it turns out that some of these funds are not fully hedged.

savers who wish to quit. An open-ended fund entails much more buying and selling and therefore higher operating costs. As a result, while a closed-end fund might charge investors around 0.5 per cent (of the value of the fund) per annum, charges for a unit trust or OEIC might be around 1.5 per cent.

It should be clear from this description that a closed-end fund has many of the characteristics of a publicly quoted company. One cannot put funds into the company itself, but, if one wishes to benefit from the skills of the managers, one can buy shares in the company. And this is effectively what closed-end funds are – listed companies whose job happens to be investing in other companies' shares (or other securities) rather than the production of goods and services. This is why the details of shares in closed-end funds are usually listed along with the details of shares in all other publicly quoted firms in the financial press. In the UK, such funds are called 'investment trusts' and their details are quoted on the 'London Share Service' pages of the *Financial Times*, along with all other quoted companies. (The word 'trust' is thus misleading but has survived from the nineteenth century when these funds were first established as genuine trusts.) Like other companies, they can issue various types of shares to shareholders and they can borrow. The latter is useful when markets are rising, since the interest on the loans will usually be less than the return from the additional assets which can be bought with the loan.

We noted earlier that one of many differences between DTIs and NDTIs is that the latter tend to experience flows of funds which are 'contractual'. People make regular payments into pension funds and insurance policies and these buy them an agreement that the pension fund or insurance company will make payments to them in the event of some specified contingency, accident, illness, retirement, death etc. Both of these conditions make the flows of funds experienced by NDTIs relatively stable and predictable, especially when contrasted with funds entering and leaving DTIs. These tend to be 'discretionary'. People hold additional deposits after they have made all their other expenditure decisions. When they reach a certain threshold, they may be withdrawn and converted to something else. The position for mutual funds is somewhere in between. Most funds operate regular savings schemes, where the saver contributes a fixed monthly amount. This has the advantage to the fund that its inflows have some degree of predictability. On the other hand, they also accept 'lump-sum' investments and these may be quite

volatile. In countries (like the UK) where there are tax advantages relating to investment in each tax year, mutual fund inflows may tend to bunch toward the end of the tax year as people make last minute decisions not to pass the tax-saving opportunity. More generally, mutual fund inflows and outflows are likely to be strongly affected by the performance of markets in which they invest. Stock market slumps, for example, will reduce net investment in mutual funds and could, in the worst case, cause net withdrawals.

## 2.6 Summary

The defining characteristics of financial systems lie more in the nature of the institutions that make up those systems than they do in the markets. We shall see some of the differences in the next few chapters.

In this chapter we have divided financial institutions into deposit-taking and non-deposit-taking institutions, noted their main features and explained some of the principles on which they work. Deposit-taking institutions, for example, are institutions whose liabilities act as a country's principal means of payment and form the largest part of its money supply. For both reasons, such institutions tend to be highly regulated and to have access to a 'lender of last resort' which can provide liquidity if the deposit takers are threatened with illiquidity. Illiquidity risk is one of the main risks faced by such institutions and comes about fundamentally because deposit liabilities have a shorter maturity than the loans which are DTIs' main assets, but is exacerbated by deposits' use as means of payment and the fact that decisions to hold deposits, as opposed to other forms of financial wealth, are discretionary rather than contractual. These two circumstances give deposit inflows and outflows a degree of volatility which is not experienced by NDTIs.

By contrast, the main NDTIs, insurance companies, pension funds and (to a lesser extent) mutual fund organizations, have inflows and outflows which are contractual and/or can be estimated with some degree of reliability. The fact that inflows and outflows can be estimated depends to a large extent upon the 'law of large numbers' and this enables all financial institutions to engage in some degree of maturity transformation – holding liabilities which are of shorter maturity than assets.

## Key concepts in this chapter

Bank-based	General insurers	Pay-as-you-go pension scheme
Market-based	Reinsurance	Funded pension scheme
Short-termism	Law of Large Numbers	Dependency ratio
Universal banking	Mean	Defined benefit
Retail banking	Standard deviation	Money purchase
Investment banking	Loading	Open-ended mutual fund
Corporate banking	Mis-estimation	Closed-end mutual fund
Asset management	Parameter change	Unit trust
Wholesale banking	Correlation coefficient of returns	Investment trust
Asset risk	Catastrophe risk	Hedge fund
Liquidity risk	Adverse selection	Pension system
Payment risk	Moral hazard	
Maturity transformation	Retirement annuity	
Life offices		

## Questions and problems

- Distinguish between 'asset risk', 'payment risk' and 'liquidity risk' as faced by banks.
- Explain why 'liquidity risk' is a particular problem for banks (when compared with non-deposit-taking institutions). How can banks protect themselves against liquidity risk?
- 'Provided an insurance company bases the premiums it charges on the claims resulting from a large sample of homogeneous and statistically independent past exposures, its premium income will always be sufficient to meet claims.' Do you agree? Why or why not?
- Why should it matter to an insurance company whether or not the exposures it is called upon to cover are:
  - large in number?
  - part of a known phenomenon?
  - statistically independent of one another?
  - homogeneous in character?
  - unaffected by the fact of insurance?
- Explain how limits to the applicability of the insurance principle can lead to financial exclusion.
- How much truth is there in the accusation sometimes levelled against insurance companies that they are in business to provide cover for people who do not need it?
- Do insurers face a dilemma between trying to differentiate as finely as possible between sub-groups within a given class of business and seeking to reduce risk by making use of the LLN?
- Is it reasonable to argue that provision for old age should be left as a matter for individual choice? If your answer is 'no', what do you consider to be the strongest argument against doing so and why?
- Distinguish between (i) PAYG and funded pension schemes and (ii) defined benefit and defined contribution schemes. In both cases, identify the main advantages and disadvantages of each member of the pair.
- Distinguish between 'closed-end' and 'open-end' mutual funds. Why are management charges in the former generally lower than in the latter?
- Why do the shares in investment trusts often trade at a discount to the value of the underlying assets in the fund?

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## Chapter 3

# The UK financial system

**Murray Glickman with Peter Howells**

*What you will learn in this chapter:*

- The functions of the major institutions comprising the UK financial system
- The comparative size of those institutions judged by stocks of assets and by flows of funds
- Their importance in financing real economic activity
- Their importance as traders in financial markets

### 3.1 Introduction

In this chapter, we look at the main characteristics of the UK financial system. As we said in the last chapter, the distinctive characteristics of a financial system lie largely in the institutions which comprise the system and the way(s) in which they are regulated. Accordingly, the chapter proceeds by examining in turn each of the groups of intermediaries briefly described in Chapter 2. Under each heading we indicate the scale of activity and the sources and uses of funds. We also outline the main features of the relevant regulatory regime.

There are various ways in which data can be used to compare the size and behaviour of financial intermediaries. Firstly, one can look at the use which is made each year of funds received from savers. For this, we require data on the **net acquisition of assets**. These are assets *purchased* during a period of time, *less* assets sold. This does not of course measure the flow of new lending to ultimate borrowers, since many of the assets purchased will be assets already in existence; these are assets created by earlier lending, the institutions taking over the loan from a previous holder. Neither does it measure the total scale of trading in assets by any particular institution. In the course of a year an insurance company, for example, will buy and sell many assets of any given type. Its total sales and purchases of a given asset constitute the **turnover** in that asset while the net acquisition, as we said, is the difference between sales and purchases. Finally, we could compare **stocks of assets** currently held. This would involve looking at *balance sheet* data and that data would show the sum of net acquisitions cumulated over previous years. Comparisons made in this way would obviously be strongly affected by decisions made in the past.

For banks and building societies Tables 3.1 and 3.2 (respectively) give data on both stocks of assets and also changes in those assets in the most recent year for which data is available. Thus one can judge the size of banks and building societies either in terms of their accumulated wealth or in terms of the flows of funds

which they are directing into new assets. One can also see the direction of those funds.

Our comparison of other (non-deposit-taking) financial intermediaries is based around Table 3.4 which shows data for net acquisitions and thus enables us to compare the scale of funds available for disposal by each institution and the way in which those funds were used in the most recent period for which data is available, and around Table 3.5 which shows stocks of assets. Using all four tables, comparisons can obviously be made between each type of intermediary. For non-deposit-taking institutions we then include a further table (3.6) which shows the part played by each type of institution in the turnover of selected securities.

### 3.2 Banks in the UK

The UK banking sector has traditionally been highly segmented. Until the last 20 years or so, it was possible to read about the activities of ‘retail banks’, ‘accepting houses’, ‘discount houses’ and so on. And these divisions were maintained in the official statistics. Until the mid-1990s, for example, the *Bank of England Quarterly Bulletin* used to publish a list of institutions to whom the Bank of England had granted a banking licence. The list ran to more than 450 institutions and these were allocated to one of seven sections, reflecting their function. The distinctions were maintained in the published statistics so that it was possible to compare the balance sheets of ‘retail banks’ with, for example, those of ‘British merchant banks’. This no longer makes much sense. As we explained in Section 2.3, what we think of as ‘a bank’ is often just one division (usually the retail division) of a much larger banking *group*. The group as a whole will offer a full range of banking functions and even a variety of financial services, like asset management, which we would not usually think of as part of banking at all. Barclays plc is a name which most people in the UK would immediately recognize as a major retail bank, but as Figure 3.1 shows, Barclays is a large

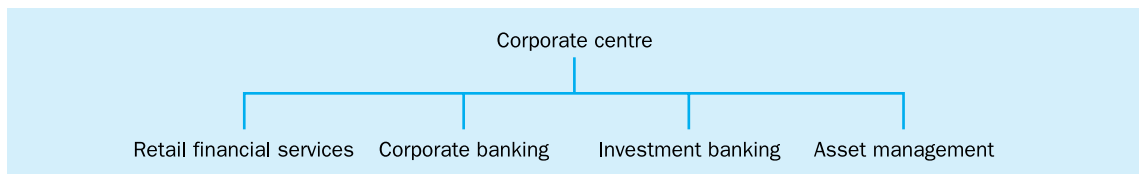


Figure 3.1 The Barclays Group

conglomerate which operates a retail banking division alongside corporate and investment banking and asset management functions.

In these circumstances, we can still distinguish between different types of banking *function* or *activity* (retail banking *is* different from investment banking) but we should not think about these activities being the sole activity of a particular *firm*. There are some investment banks in the UK which specialize only in that activity but most banks, and certainly all retail banks, are parts of a much larger group which offers everything. The Bank of England now publishes the list of banking licence holders in its *Annual Abstract of Statistics*. In the current list, banks are classified by their ‘nationality’ – the location of their headquarters.

Table 3.1 shows the assets and liabilities of UK banks at the beginning of 2004, distinguishing between sterling and foreign currency items. Bearing in mind our discussion in Section 2.3 about liquidity risk, the first thing to notice is the very small ratio of instantly

available ‘liquid reserves’ to the rest of the balance sheet. For example, if we add ‘notes and coin’ and ‘Balances at the Bank of England’ we have a figure of £9,582m. But this figure does not strictly correspond to ‘reserves’ since the figure for ‘Balances at the Bank of England’ includes ‘cash ratio’ deposits. These are deposits which banks must maintain at the Bank of England, up to 0.15 per cent of their assets, in order to generate income for the Bank. ‘Operational deposits’ are only a subset of the figure in Table 3.1, amounting in January 2004 to about £63m. If we add these to notes and coin to calculate a ‘reserve ratio’ (reserves/deposits) it amounts to just 0.53 per cent if we use only sterling deposits and to about half that, 0.27 per cent, if we include foreign currency deposits. In the UK this ratio is a ‘prudential ratio’, that is it is chosen by banks themselves in the light of what experience tells them is a safe minimum. There is a requirement, however, that any bank that intends to change this ratio should give prior notice to the Bank of England so that the Bank is always in a

**Table 3.1** Foreign currency liabilities (inc. euro): Sight and time deposits

Sterling assets		Sterling liabilities	
Notes and coin	7,910	Sight deposits	683,385
Balances at the Bank of England	1,671	Time deposits	657,272
Market loans	455,064	CDs and other paper	158,746
Advances	1,113,281	Liabilities under sale and repurchase	
Bills	18,983	agreements	151,660
Claims under sale and repurchase		Sterling capital	220,959
agreements	141,632	Other	56,573
Investments	140,398		
Other	75,272		
<b>Total</b>	<b>1,954,211</b>	<b>Total</b>	<b>1,928,595</b>
Foreign currency assets (including euro)		Foreign currency liabilities (including euro)	
Market loans and advances	1,057,912	Sight and time deposits	1,284,820
Claims under sale and repurchase		Liabilities under sale and repurchase	
agreements	787,583	agreements	267,693
Bills	32,412	CDs and other paper	666,655
Investments	368,080	FC capital	59,746
Other	183,976	Other	176,670
<b>Total</b>	<b>2,429,964</b>	<b>Total</b>	<b>2,455,586</b>
<b>TOTAL ASSETS</b>	<b>4,384,175</b>	<b>TOTAL LIABILITIES</b>	<b>4,384,181</b>

Source: [www.bankofengland.co.uk/mfsd/iadb](http://www.bankofengland.co.uk/mfsd/iadb).

Note: totals/subtotals do not balance/sum owing to rounding.

position to form a view about the likely availability of liquid assets relative to banks' requirements. Table 3.1 aggregates all banks and the ratio we have just calculated is a broad average. If we could break the table down to show different types of banking functions we would find that this ratio would be higher for retail banking divisions, probably around 1 per cent, and lower for non-retail banking. Such a very low reserve ratio makes the availability of 'second tier' liquidity very important. In the UK this is provided by 'market loans', 'repurchase agreements' and 'bills'. Market loans are loans to the interbank and other money markets, many of them for very short periods or even overnight. The latter can be liquidated on demand or 'at call'. Repurchase agreements (when listed under 'assets') are loans that have been made, again usually to other banks or other financial institutions, by 'buying' assets (usually government bonds) from the borrowing firm on the strict condition that the borrower will repurchase them within 14 days at a higher price. Bills are short-term money market securities with an original maturity usually of three months. By holding a range of 'repos' and bills, banks can ensure that they have a continually maturing stock of interest-earning assets which provide them with a constant flow of funds. In a real emergency, a fraction of these assets can be easily liquidated at a moment's notice. (Details of these money market instruments are given in Chapter 15.)

The bulk of banks' earning assets are held in the form of loans or 'advances' to the 'non-bank, non-building society private sector' ('M4PS' for short!). 'Investments' refers primarily to securities and most of these are short-dated government bonds.

Table 3.1 suggests that sterling business and foreign currency business account for about 44 per cent and 66 per cent of the total, respectively. But this is true only for the banking system as a whole. In retail banking, foreign currency deposits make up less than 25 per cent of the total, while wholesale banking foreign currency business accounts for about 70 per cent. What the table also conceals between different types of bank is the importance of 'sight' or 'demand' deposits against 'time' deposits (including CDs). Retail banks are central to the payments mechanism. For this reason virtually everyone needs a bank sight deposit account and sight deposits make up about 50 per cent of retail bank deposits. But for wholesale banks, deposits are much more likely to be time deposits. Consequently the degree of 'maturity transformation' undertaken by wholesale banks is less than it is for retail banks and this partly

explains why wholesale banks can operate with smaller reserve ratios than retail banks.

Until 1998, supervision of the UK banking system rested with the Bank of England, under the terms of the Banking Act, 1987, which required the Bank of England to exercise the following powers:

- licensing of all deposit-taking institutions (except building societies);
- ensuring that institutions have adequate capital, liquidity and controls;
- ensuring that they make adequate provision for bad debts;
- checking that directors of banking institutions are 'fit and proper persons'.

In 1997, however, the Bank of England was given 'instrument independence' for the conduct of monetary policy. The thinking behind this, a desire to free the Bank of political constraints on its actions, is discussed in Sections 14.5 and 14.6. But political pressure is only one source of potential interference with a central bank's conduct of monetary policy. A central bank might, for example, be reluctant to raise interest rates if it happens to know that some commercial banks are facing a high level of bad debts which is likely to rise further if interest rates go up. So long as it is responsible for supervising the banking system and maintaining stability, a central bank is likely to delay raising interest rates if it knows that one consequence might be bank failures.

To avoid this conflict of interest, therefore, the supervisory powers listed above were transferred from the Bank of England by the Bank of England Act in June 1998 to a newly established Financial Services Authority (FSA) which will eventually be responsible for the supervision of all financial intermediaries.

Banking, like most forms of financial intermediation, is increasingly an international activity. Banks with headquarters in one country, for example, may operate subsidiaries in many others. This poses a problem for supervisors partly because differences between national rules may lead to distortions in the pattern of banking activity whereby banks concentrate certain types of business in those countries where regulation is lightest and partly because there is a danger that foreign subsidiaries 'fall between the cracks' when it comes to supervision: the home authority cannot exercise supervision in the host country, while the host country supervisor may not feel a responsibility for foreign banks. Thus much effort in recent years has gone into the international coordination of banking supervision. For example,

the capital tests imposed by the FSA are enshrined in the EC Capital Adequacy Directive, 1996. These in turn are based upon recommendations of the so-called 'Basel Committee' in 1998 and involve calculating a 'risk-adjusted' measure of bank assets. The details are discussed in Chapter 25, but essentially the calculation involves attaching 'weights' (=1 for commercial loans, 0.5 for mortgage loans, 0 for cash, for example) to each category of assets. The value of assets when adjusted for risk is clearly less than the unadjusted value, but unlike the unadjusted value it will change if assets of the same value, but different risk weights, are substituted for each other. Having calculated a risk-adjusted value for assets, the next step involves calculating the bank's total capital (subject to certain definitions and rules about proportions) and comparing this with risk-adjusted assets. The recommendation, widely accepted in industrial countries in 1993, was that the ratio of capital to risk-adjusted assets should not be less than 8 per cent.

Devising a regulatory system where nothing falls between the cracks requires not only an international set of rules, but some agreement about supervisory responsibilities where firms' activities cross international boundaries, as they usually do. The EC Second Banking Coordination Directive, 1993, places the responsibility for supervision of overseas branches on the home supervisor but lays down rules to ensure cooperation between home and host authorities. Thus branches of banks with headquarters in other EU states are permitted to operate in the UK on the strength of the licence issued in the home country, while the FSA is responsible for the supervision of branches of UK banks operating in other EU countries on the strength of the licence issued in the UK by the FSA.

Banks in the UK are subject to pressures for change which affect banks throughout the western economies although the results have not always been the same as in other countries. The most noticeable trends in recent years have been the increasing automation of banking services (surely a worldwide phenomenon), the concentration of the industry through merger and acquisition (certainly a European and North American trend), the closure of branches (a rather more peculiarly British development involving mainly retail banks) and the increasing use of securitization. Such trends are not independent of one another but we can only discuss

each in turn, pointing out the connections. When it comes to mergers, we shall also point to an interesting pattern which these have taken, which is perhaps rather different from what one might expect.

Like most industries, banking has been dramatically affected by technological developments in the last quarter-century. Many of these are linked to improvements in communication and thence to the revolution in information technology. Two of these, which have had far-reaching consequences, have changed dramatically the provision of the core banking activities of deposit-taking and payments.

The first is the development of automated teller machines ('ATMs') or 'cash dispensers' as they are often called. The latter is an interesting misnomer. It is true that when the first machines were introduced in 1967 they did little more than give the customer access to cash in a fixed amount. In 1977 there were about 1,300 machines, which by then offered customers a choice of withdrawal amounts together with a statement of current balance. By 2002 there were 41,000 machines. About 25,000 are sited on bank premises but the growth in these locations is now very slow. The remainder are sited in 'remote' locations like supermarkets, railway stations, filling stations etc. and growth is much more rapid in these sites, new machines being opened at the rate of about 1,000 a year. Although still primarily used for access to cash (there were 2.3bn withdrawals averaging £60 in 2002) these machines now offer a wide range of services from the ordering of statements and cheque books to changing PIN numbers. The size of withdrawals can now be user-specified across a wide range and developments in communication technology now make it possible to use a card in virtually any machine, including machines located overseas for the withdrawal of foreign currency. Although not yet in use in the UK, machines exist which can scan a cheque and credit specified amounts across a number of accounts. In some branches, machines with touch-sensitive screens provide on-screen links to a variety of product descriptions, take customers through a series of questions and answers before recommending a product or providing a quotation and can create a video-conferencing link with staff at a central location to deal with more complex enquiries.<sup>1</sup>

At least as important to banks, though of lower profile than ATM development, is the progressive

<sup>1</sup> The figures in this paragraph are taken from APACS (2003).

**Box 3.1 Recent trends in UK payment methods (millions)**

	1992	2002	annual % change
CHAPS	9,079	30,845	12
Cheque	3,332	2,393	-4
Automated	1,962	3,929	+7
Credit card	794	1,687	8
Debit card	522	2,994	19
Cash at ATMs	1,837	2,268	2
Cash payments > £1*	15,100	13,000	-1

\*estimate

Source: APACS, *Handbook of Payment Statistics*, 2003, table 8.1.

automation of the payments mechanism. Box 3.1 shows clearly the trend away from cheque and other paper-based methods of payment (and away from cash) and toward electronic-based methods.

Though strictly dependent upon cost structures, merger and consolidation is a feature of most maturing industries and it has been a characteristic of banking since the earliest days. This partly reflects the economies of scale that are present in most financial activity, but it is also partly a product of the benefits of diversification and, until the early twentieth century, it also reflected the increasing integration of the national economy in the UK. When trade was local and then regional, a regional banking system was perfectly adequate. But when markets became national and trade and payments went from one end of the country to the other, a national network of banks had obvious attractions. Hence the history of the current big four (Barclays, HSBC, RBS-NatWest and Lloyds-TSB) is a continuous history of absorption of the smaller by the larger.

However, the economic need for a national banking system in the UK was met some years ago. With the top four banking groups holding 60 per cent of UK sight deposits, the question confronting further mergers is whether the process has gone too far when it comes to competition and consumer choice. In 2000, the merger between the Royal Bank of Scotland and NatWest was accepted by the competition authorities, but of the two further mergers proposed in 2001 (Halifax with Bank of Scotland and Lloyds-TSB with Abbey National) only the former was allowed.

On the face of it, therefore, the integration of the national economy can hardly be called on to justify the continuing trend to consolidation and we maybe have to look to economies of scale and diversification as the driving forces. But before doing so, it is worth considering whether the demands that originally flowed from national integration might be replaced by those that flow from international integration. As we shall see in Chapter 21, the European Union has been striving for years to create a European single financial market by reducing national barriers of all kinds. Furthermore, a large part of the EU is about to move to the final stage of a single currency. If patterns of trade once made it important to develop a banking system comprising a few large firms with national coverage, one might well ask whether the further integration of a European-wide economy might have the same effect. And if so, does this suggest that future bank mergers (within the EU) might be across national boundaries? There is a limited parallel in the case of the USA where, until 1984, banks were forbidden to operate across state boundaries. Since the lifting of the restriction about half of all bank mergers have involved crossing state boundaries.

But so far the European experience has been very different. The three mergers we referred to above all involved UK banks. In 1999 merger negotiations between Deutsche and Dresdner banks reached an advanced stage before being broken off while discussions between two French banks, Banque National de Paris and Paribas, succeeded. In Europe there does seem to be a preference for intra-national mergers: in 1995, of 32 bank mergers within the EU, just eight involved cross-border consolidation; in 1997 when the total more than doubled to 67, only seven involved mergers between banks from different countries (Danthine *et al.*, 1999).

It is not entirely clear why this should be the case. Clearly, cross-border mergers in the EU raise issues of culture and language which are largely absent in the USA. The outcry raised against the manner of Marks and Spencer's withdrawal from French retailing in 2001 shows just how different management and worker attitudes to employment protection are across Europe and one can imagine that while there may be advantages of economies of scale and diversification to be had from national mergers, banks may prefer this route until forced to look across borders. These preferences will be further strengthened if bank clienteles differ between countries. (The German and British attitudes to credit would hardly encourage Anglo-German bank

## Box 3.2 Slow benefits of mergers

## BANKING

# Merger savings come slowly for Agricole

By Martin Arnold in Paris

Crédit Agricole, France's biggest bank by assets, was yesterday forced to admit that its integration with Crédit Lyonnais was proving tougher than expected as it warned it would achieve less than half its €574m (\$707m) planned synergies from the merger this year.

The warning came as the bank reported an 8.5 per cent decline in full-year consolidated net profits to €1.14bn, below analysts' expectations, because of €1bn of exceptional charges and goodwill write-downs to cover the cost of integration.

The mutual bank, which bought Lyonnais for €19.5bn last year, blamed the slower realisation of synergies on delays to closing the deal caused by legal challenges from rival banks, which dragged it out until June.

Agricole said it would only achieve €275m of the €574m synergies it had planned for this year. It also said

synergies would reach €620m in 2005, instead of €738m, before hitting €760m in 2006.

Investors seemed to have already taken the more gradual timing of synergies into account, as Agricole shares closed up 7.3 per cent at a new 52-week high of €21.51.

To account for the costs of integrating Lyonnais, which Agricole said had involved some 25,000 staff worldwide, the bank recorded a €513m restructuring charge against income and €532m of synergy-related costs against shareholders' equity.

It recorded a €203m exceptional goodwill write-down for its stake in Rue Impériale, the investment company merging with the private equity group Eurazeo.

Excluding the effect of exceptional costs and goodwill amortisation, Agricole said net profits rose by 28.5 per cent to €2.4bn, giving it an annualised return on equity of 10.6 per cent.

René Carron, chairman, said 2003 was an 'outstanding year' for the group. 'Net banking income came back to a positive trend and the cost of risk returned close to more normal levels,' he said.

Gross operating income in the fourth quarter rose 49 per cent to €1.14bn, boosted by consumer finance operations, the Lyonnais retail banking network and its asset management, insurance and private banking.

■ Agricole is to be fined \$13m by the US Federal Reserve and the banking department of New York for breaking banking regulations in New York, according to the Fed, reports AFX News in New York.

The move follows accusations that the bank failed to respect an agreement dating back to 2000 with the regulatory authorities for shortfalls in its accounting system and for failing to provide certain documents.

Source: *Financial Times*, 11 March 2004.

mergers.) Shareholders, too, have to be persuaded of the merits of a merger and if they perceive sharp cultural and institutional differences, even if the perception overstates the reality, this will discourage firms.

It may be that what we are witnessing is something of a 'pecking-order' approach wherein the easiest mergers are carried out first and these are domestic mergers. However, when the degree of domestic concentration begins to raise competition questions (when two or three banks have 30 per cent shares of the market, for example) banks will then be forced to look across national borders to find new partners. There is a little evidence for this in that such cross-border mergers that have occurred have been concentrated in Scandinavia and the Benelux group of countries. Individual country

markets here were small and had the highest degrees of concentration by the mid-1990s. Further mergers were not possible without crossing national boundaries. It is interesting too that both groups of countries have a degree of cultural, if not linguistic, homogeneity that is absent across the EU as a whole. One thing is for certain and that is that the prospect of economies of scale (especially with the automation of banking services) and the risk-reduction of diversification (greater surely across national boundaries than within them) will continue to push the banking system toward ever greater concentration.

When Barclays plc announced that it was going to close 171 branches on a single day in April 2000, this caused an outcry amongst customers and consumer

pressure groups. However, Barclays was far from alone in its policy of branch closure and may not even have been in the forefront. The NatWest bank reduced branch numbers from over 3,000 in 1988 to about 1,700 in 2000; HSBC reduced the numbers from 2,000 to 1,600 over the same period. The total number of UK branches fell from over 20,000 in 1989 to 17,000 in 1994 and to below 15,000 by 2000.

The reasons for such closures are twofold though both are closely connected with the increasing automation of basic banking services that we referred to above. Firstly, it is now possible for clients to carry out many of their banking operations by telephone and by internet. In April 2000, for example, Barclays was quoted as having 1.2m telephone banking customers and 800,000 'online' accounts. The latter had grown at a staggering rate from just 20,000 a year earlier. There is therefore some truth in banks' assertion that the decline of branch banking is demand-led, by customer preference.

However, it is interesting to note what is happening in branches that have remained open and in particular in those into which banks have put most investment. This suggests that there may be other advantages – to banks and their shareholders – and that banks may not be simply following customer preferences. (The fact that some banks offer 'internet tuition' at selected sites itself suggests that they have some interest in 'encouraging' consumer preferences.) The branches into which banks have put most development effort are in major centres of population. No doubt this reflects the familiar banking economies of scale again. But it also means that these branches are open to a large potential market for a whole range of financial products and services. A careful examination of any of these branches confirms that traditional banking functions (deposits and cash withdrawals) occupy a minority of space in large banking halls which were originally designed for a very labour-intensive operation. The reduction in cashiers and counter space has been facilitated by the development of ATMs which will also be found inside the banking hall, offering the full range of services we referred to above. The remaining space, typically half the floor area, will be devoted to the marketing of a range of products and services, some of which (foreign exchange, personal loans, trustee and executorship) are traditional activities, while some (insurance, mortgages, pensions, mutual funds) most decidedly are not but represent the movement towards universal banking that we discussed at the outset.

'People, paper (work) and premises' are expensive. This is especially true for banks where traditionally there has been little scope for employing unskilled labour and where premises have had to be located in prime business sites. Technology has lifted some of this burden. It enables the closure of peripheral sites and the concentration of activity in fewer larger premises. By automating many traditional banking functions it raises productivity (partly by shifting the work of keying instructions onto customers themselves). Fewer, and less skilled, staff are required for these functions while others can be redeployed to the more profitable task of selling (non-bank) financial services and products. The downside of all this is the restricted access to banking services for those who live away from major centres and do not have access to internet facilities through choice or, more usually, for reasons of income and education. This, together with banks' understandable desire to target their products and services at their most affluent customers (see Case Study 4), has led to public concern that sections of the community (typically the poor and the elderly) are in danger of suffering 'financial exclusion' (see Case Study 5). Not only is it more convenient in many cases to make payment by direct debit or other electronic means, we have seen that it also is cheaper for everyone. This is sometimes reflected in discounts to people who pay bills by these methods. Those without a bank account are denied these benefits. A more immediately pressing issue has been the plan by UK government to pay social security benefits directly to bank accounts (rather than in cash over a Post Office counter). Notice that the cost savings from replacing the physical handling of paper and coin by automatic/electronic payment have once again proved irresistible (this time to government). This clearly raises the question of how the 'non-banked' public is to receive these payments, as well as a question about the future profitability of smaller Post Offices for which this work was a valuable source of income. In April 2001 the major retail banking groups announced that they would establish a 'basic' bank account, with limited facilities and no direct costs, for anyone who wanted one and that they would arrange for these facilities to be available via Post Offices. In addition, they agreed to pay £180m spread over five years to help set up a 'Universal Bank' to be run by the Post Office. The centrepiece would again be an account with very limited facilities (no borrowing, for example). The numbers of the potentially excluded are not trivial. When these agreements



were announced it was estimated that between two and four million people might benefit.

The closure of bank branches has been a trend largely confined to retail banks, which traditionally relied upon branches as the ‘gateway’ through which customers accessed banking services. It is of little relevance to wholesale banks. A final trend which has affected all banks to some degree has been the increasing development of **off-balance-sheet activities** and, within this broad category, of ‘securitization’ in particular. ‘Off-balance-sheet activity’ refers quite simply to any income-generating activity which does not create a corresponding balance sheet entry. It is worth noting immediately that it is only the very distinctive nature of banking business that makes off-balance-sheet activity remotely interesting. Consider, for example, the case of a firm manufacturing washing machines. Its balance sheet shows its assets and liabilities at a particular moment. Its liabilities will be largely determined by its capital structure (bonds, equity and so on) while its assets will consist largely of its premises and other productive equipment. The number of washing machines that it manufactures in any particular week is quite remote from the balance sheet. Conceivably the output decision could have some effect upon short-term assets (‘amounts due’) and upon the size of its bank overdraft, but even this supposes quite a large variation in output. The firm might even be able to add or remove new models from its range without having much noticeable effect upon the balance sheet. Traditional banking activity is quite different. Taking a single additional deposit or making a single additional loan changes the balance sheet immediately. The ‘inputs’ and ‘outputs’ of banking business are themselves balance sheet items. Hence, the idea that banks might engage in off-balance-sheet activity is a curiosity, something which is untrue for any other type of firm.

Given this definition, it is clear that many of the activities which banks are promoting through their changing use of branches falls into this category. If a bank sells an insurance policy, it earns a commission which appears ultimately in its profit and loss account. There is no change to its balance sheet (though the insurance company has an additional liability). Similarly, if customers buy into a unit trust, the fund management company pays a fee to the bank and takes the additional liability and asset on to its own balance sheet. The guaranteeing (or ‘accepting’) of commercial bills which used to be the staple activity of British merchant banks is another example. The bank earns

a fee in return for the guarantee. The bill, however, remains the liability of its issuer. It only becomes a liability for the bank if some other event happens first (the bankruptcy, or at least the inability to pay, of the firm when the bill falls due for payment). Because something else has to happen first, guaranteeing is sometimes said to create a ‘contingent liability’, a liability contingent on something else happening. ‘Securitization’ refers to the creation of a tradable asset out of a non-tradable one. If a bank lends to a firm by buying its bonds, for example, those bonds can subsequently be traded (sold, for example, if the bank needs liquidity). If it lends by granting a conventional loan, that loan remains on its books until repaid by the borrower. It cannot be disposed of to a third party. In recent years, however, banks have found it convenient to set up separate companies (‘special purpose vehicles’) for the specific purpose of ‘buying’ the loans from the bank, using bonds which it issues to the general public. On the bank’s balance sheet, ‘loans’ are replaced with ‘money’, the deposits with which the public bought bonds from the special purpose vehicle.

Clearly, in most cases the rationale for off-balance-sheet activity is that it is more profitable than traditional banking activity. However, as we shall see in Section 24.3, where we discuss securitization in more detail, it can also be driven by regulation. We noticed earlier that banks are required to maintain an 8 per cent ratio of capital to risk-adjusted assets. Commercial loans have a risk weighting of ‘1’ while money (‘cash’) has a weighting of ‘0’. Without changing the *size* of the balance sheet, securitization can have a dramatic effect upon the quantity of risk-adjusted assets.

### 3.3 Building societies in the UK

As we shall see in a moment, the history, function and regulation of building societies distinguishes them quite clearly from banks. They are, however, deposit-taking institutions and since 1989, when M4 replaced M3 as the official measure of broad money in the UK, their deposits have been unambiguously ‘money’. Together with UK banks they form what the ECB refers to as the UK’s ‘Monetary Financial Institutions’ (MFIs).

‘Unambiguously’ is worth stressing. For most of the 1980s, the treatment of building society deposits was something of a problem. Undoubtedly depositors themselves saw the deposits as money. They could go into a

building society branch and draw cash on demand. For larger purchases they could obtain, also on demand, a cheque signed by the manager payable to whomsoever they nominated. In the first case, though, it was the cash that was money while in the second case careful examination of the cheque would show that it was drawn on the building society's bank. It was the building society's *bank* deposit that was functioning as money, not a deposit with the society itself. As we shall see in the next section, competition between banks and building societies drove their products closer and closer together during the 1980s. Eventually, the Building Societies' Act, 1986, removed some of the formal distinctions. Most importantly it allowed building societies to issue cheque guarantee cards (so their own deposits became instantly acceptable as means of payment), and it provided for societies to 'incorporate' themselves as banks. At the time, building society deposits were included in a measure of 'liquidity', 'PSL2', but not in M3. After the 1986 Act this differential treatment of building society deposits became very difficult to sustain. A change was finally forced by the decision of the Abbey National Building Society, at the time the second largest society, to convert to banking status in 1989. This would have meant an overnight increase in M3 of about 11 per cent. This large break in the series persuaded the Bank of England to discontinue publication of the M3 measure and to treat M4, first published in 1987, as a replacement for PSL2, as the official measure of broad money. (A brief history of UK monetary aggregates is provided in Chapter 12.) Thus, *from a monetary point of view*, the societies have become indistinguishable from banks.

Building societies began in the eighteenth century as friendly or **mutual societies**, often with a local focus,

into which members made periodic payments in order to finance the building of houses. Unlike banks, therefore, a society has no shareholders; its members are the 'owners' and they lend to the society by, technically speaking, buying shares, though these shares are, in effect, deposits. In the early days, it was quite common for building societies to be dissolved once their specific house building programme was completed. Some, however, became 'permanent' societies, adopting a continuous programme of housing construction and finance and it is these that have survived to today.

The history of the societies is important because it explains why, although in many respects it seems natural to treat them as a form of bank, they have been able to behave rather differently from banks and have been subject to different regulatory regimes. Because they were mutual societies, their regulation was for many years the responsibility of the Registrar of Friendly Societies. Because they were not companies their trade association, the Building Societies Association, was able for many years to operate a system of 'recommended' deposit and mortgage (interest) rates without contravening restrictive practices legislation. These were usually below market-clearing rates and thus provided comparatively cheap funds for house purchase but also created queues for mortgages and led to non-price rationing. The interest rate cartel broke up in 1983 following the entry of retail banks into the mortgage market.

Table 3.2 shows the distribution of UK building society assets and liabilities at the beginning of 2004. Comparing Tables 3.1 and 3.2, it is immediately obvious that the building society movement is only a fraction of the size of the banking system. Just like bank deposits, building society deposits are used as

**Table 3.2** UK building societies, assets and liabilities, end January 2004 (£m)

Assets		Liabilities	
Notes and coin	380	Retail shares and deposits	147,858
Bank and building society deposits, inc. CDs	16,592	Wholesale deposits and CDs	37,954
Public sector securities	1,010	Bonds	15,704
Other liquid assets	23,871	Reserves	17,183
Commercial assets	175,574	Other	1,336
Other	2,608		
<b>Total assets</b>	<b>220,035</b>	<b>Total liabilities</b>	<b>220,035</b>

Source: [www.bankofengland.co.uk](http://www.bankofengland.co.uk), *Bankstats*, table B1.3.

means of payment so that building societies must be ready to meet demand for convertibility to cash and for transfer. It will be recalled that banks do this by holding cash and very small balances at the Bank of England. By contrast, building societies rely much more on deposits, but these deposits are held with the banking system rather than with the Bank of England and are generally interest-bearing. In spite of the freedoms conferred under the Building Societies' Act, 1986, the bulk of assets remain mortgages secured on residential property (about £139bn out of commercial assets of £175bn). Much of the rest is secured on land or other property and only £763m is unsecured lending to members.

Deregulation has had slightly more impact on societies' sources of funds. Liabilities remain overwhelmingly members' deposits but some £37bn consist of wholesale funds, if we assume that building society bonds are largely held by other financial institutions.

During the 1980s, building societies found themselves under increasing competitive pressure. There was competition within the industry following the ending of the interest rate cartel in 1983. But there was growing competition too from retail banks. Societies responded with a number of innovations. They introduced new types of deposits which paid premium rates of interest for regular contributions and for minimum balances. They introduced cheque book facilities and automated cash dispensers. Nonetheless, it was felt, firstly by the societies, but eventually by government, that the existing rules, dating from the eighteenth century, put societies at a disadvantage when compared with banks, and created an artificial segmentation of the loan/deposit market which inhibited competition. For example, the existing rules restricted societies to lending only on houses or similar property. They could not make unsecured loans and thus could not permit overdrafts. This in turn meant that they could

not issue cheque guarantee cards (since they would have been breaking the law if they had honoured the cheque of any customer who went overdrawn) and so their cheque book facilities were of limited use. The first change came in 1983 when the Finance Act enabled societies to pay interest gross on CDs and time deposits over £50,000. This, at last, meant societies could attract 'wholesale' deposits from firms, since firms were responsible for paying tax at whatever rate applied to their particular circumstance. Eurobond issues were permitted from 1985.

But the biggest changes came with the Building Societies Act, 1986. This broadened the assets in which societies were allowed to invest to include commercial assets and, crucially, allowed them to make unsecured loans, though both were limited to small fractions of total assets. Since unsecured lending, even in small amounts, meant that they could now provide cheque guarantee cards, building societies were able to offer means of payment facilities on an equal footing with banks. In Chapter 24, we shall see that this broadening of the competitive front between banks and building societies had important implications for a variety of financial developments.

The 1986 Act also gave the societies powers to seek 'incorporation', subject to their giving adequate notice of this intention and subject to a vote by their members. Incorporation meant that they would become limited liability joint stock companies with shareholders rather than members. It would also mean that an incorporating society would become a bank, subject to banking rather than building society regulations. As we saw above, the Abbey National Building Society was the first to take this step in 1989. Against expectations, there was no immediate rush to follow, but, as Table 3.3 shows, conversions were commonplace from the mid-1990s, giving rise to a new category of UK bank – 'the mortgage bank' – so-called because

**Table 3.3** Conversions of building societies to plc ('bank') status

Abbey National BS	incorporated as bank	July 1989
Cheltenham and Gloucester BS	joined Lloyds Bank Group	July 1995
National and Provincial BS	joined Abbey National Bank plc	August 1996
Alliance and Leicester BS	incorporated as bank	April 1997
Halifax BS	incorporated as bank	June 1997
Woolwich BS	incorporated as bank	July 1997
Bristol and West BS	joined Bank of Ireland Group	July 1997
Birmingham Midshires BS	joined Halifax Bank plc	April 1999

of the continued importance of mortgage business. The reason usually given for wanting to do so was that incorporation as a public company would enable the 'society' to raise large quantities of capital which would enable them to offer a wider range of services, at more competitive prices. These arguments were not always persuasive to building society members, some of whom protested vigorously by forming pressure groups. However, after the Abbey National flotation, other societies found that promising shares on generous terms to existing members would guarantee that formal votes would always go in favour of incorporation. The rush to incorporate coincided (in 1996–97) with research from a variety of consumer bodies suggesting that retail customers were generally better served by mutual societies than by plcs, receiving marginally higher interest payments on deposits and being charged less on loans. It remains to be seen whether this evidence will slow the rate of transition or perhaps lead to a more vivid demarcation between mutual deposit takers and banks as the former try to exploit this goodwill.

The 1986 Act placed the regulation of societies in the hands of a newly created Building Societies Commission. Amongst other things, the Commission was required to ensure that the conduct of a society's business met the intentions of the 1986 Act. In particular, the Commission was required to check that societies observed the restrictions on their sources and uses of funds (liberalized further by a 1997 Act) and that societies were led by fit and proper persons. In principle, the Commission's powers were considerable, allowing it in the extreme case to withdraw a society's authorization to accept deposits. In 2000, the Commission's powers passed to the Financial Services Authority. Details can be found at [www.fsa.gov.uk](http://www.fsa.gov.uk).

### 3.4 Insurance companies

People take out insurance because they prefer to incur a small, certain loss (the amount of the premium paid to the insurer) in order to be protected against the risk of a much larger, and possibly catastrophic, loss resulting from adverse 'events' such as fire, theft, accident or ill-health. This principle unites all types of insurance

contract. The importance of insurance in Britain today can be gauged from the fact that the value of premiums paid to insurance companies in the UK was equal to more than 12 per cent of GDP in 2002.<sup>2</sup> However, there are major distinctions in the kinds of policy offered by insurance companies and in the types of risk covered. The distinction is so sharp that, although some of the larger firms deal in both, many specialize in one or the other. The distinction that is usually drawn is between **long-term** or **life insurance**, and **general insurance**. As an indication of the relative significance of the two sectors, we may note that the premium income generated by UK long-term business in 2002 was £97bn while that for general business, at £28.5bn, was less than a third of this amount.<sup>3</sup>

On 1 January 1999, the *Financial Services Authority* (FSA) assumed responsibility for regulating companies whose activities come within the purview of the 1982 Act. The FSA, a quango, which describes itself as 'an independent, non-governmental body',<sup>4</sup> became the single statutory regulator for all financial business with the passing of the Financial Services and Markets Act, 2000.

The 1982 Act defines general insurance and divides it into 17 classes, and long-term insurance, divided into seven classes. The former includes accident and damage to property, vehicles, goods in transit, personal liability and so on. Classes of long-term insurance include life and annuity, permanent health, marriage and birth. An additional class of long-term business is pension fund management, which, as we make clear in the next section, is now a more important part of the activities of the long-term insurance sector than specific insurance business itself.

As we said earlier, long-term insurance contracts enable people to insure against such events as death or permanent illness or disablement. For obvious reasons, life- (that is, death-) related contracts dominate. These may be of various forms. A person can insure against death within a specified period, the policy paying nothing if the insured survives. This is known as **term insurance**. Alternatively, a *whole of life* policy insures against death at any time. An **endowment** policy pays a capital sum to the insured at a specified time in the future, or on death if earlier. This sum may be a guaranteed absolute amount, in which case the

<sup>2</sup> Source: Association of British Insurers.

<sup>3</sup> Source: Association of British Insurers.

<sup>4</sup> See the FSA's *Information Guide*, downloadable from [www.fsa.gov.uk](http://www.fsa.gov.uk).

insured has a policy ‘without profits’, or there may be a guaranteed minimum plus an entitlement to share in the company’s annual profits. On this ‘with profits’ type of policy, the share in the profits accumulates as a series of annual bonuses which are paid, with the guaranteed minimum, on termination of the contract. Increasingly, the proceeds from endowment policies are linked to the value of units in a unit trust which may or may not be run by the insurance company itself. Only an authorized insurance company is allowed to provide an **annuity**, the payment to an individual of a regular income from a specified date until death in return for a lump sum paid by the individual to the company, usually at the point when he or she retires. As with other financial products, new types of insurance product are continually evolving, so this should not be treated as an exhaustive list.

It should be clear by now that the motivation behind many long-term ‘insurance’ contracts is essentially a desire to save for the future, either for one’s own benefit or for the benefit of dependants. This means, of course, that while the products are distinct by virtue of their insurance element, life insurance contracts are in competition with a whole range of other products as a home for long-term saving.

The nature of these policies determines the risks to which long-term funds are exposed. Actuarial predictions of a country’s mortality record are now very reliable and it is unlikely that a sudden change would find insurance companies struggling to meet their obligations on life policies. More probable is that changes in the products offered by competitors might cause an increase in terminations or ‘early surrender’ of policies. The most serious risk faced by long-term insurance companies, however, is that changes in economic and financial conditions cause the yield on the asset portfolio to fall below expectations. This would be serious for the companies, since investment income amounts to about one-third of total (investment *plus* premium) income, and for investors, who would share in reduced profits. In recent years, yields have been lower than those insurers have grown accustomed to. One reason is that inflation has been lower than it was in the 1970s, 1980s or even the 1990s. A second is that the climb in stock market indexes has been reversed. A third reason is that the rate of return on government securities has been low. This is a problem for some savers who had

taken out with-profits or unit-linked life policies of a given projected value as a means of repaying their mortgage at some point in the future. It also means that the value of the annuities individuals are now generally being offered when their pension plans mature is much lower than they had hoped for or expected.

Among the classes of business carried out by the general insurance sector, motor insurance is the most important, accounting for a third of written premiums in 2002. Property insurance (buildings and contents), which generated more than a quarter of the sector’s premium income in the same year, came a close second.<sup>5</sup>

The payment of premiums creates a pool of funds at the companies’ disposal. Eventually most or all of it will be used to meet claims. However, provided sufficient funds are available or can be quickly recovered to make claims payouts as they fall due, the remainder can be placed in earning assets by the companies and thereby provide a further source of income. It follows that investment opportunities arise for general as well as long-term insurance companies. However, to say this does not fully capture the importance of investment for the viability of general insurance business. To illustrate, consider the fact that the UK motor and property sectors operated at an overall underwriting loss of £0.2bn in 2002.<sup>6</sup> In other words, premiums received by companies failed to cover the cost of claims met by them. The ability of companies to satisfy fully their obligations to clients who had incurred insured losses was due to the returns they were able to earn by investing monies paid by these same clients in premiums. In fact, competitive pressures within the general insurance sector sometimes drive premiums down so low in relation to likely claims levels that companies have been known to plan for underwriting losses to be made good by investment income – a practice known as *cash flow underwriting*.

While the investment function is thus no minor matter for general insurers, it is obviously absolutely central to long-term insurers, many of whose products are primarily savings vehicles, as we have already noted. This contrast explains the difference in asset growth between the long-term and general insurance sectors apparent in Table 3.4, which indicates that the funds available for the former to invest were some 12 times larger than those available to the latter in 2002. (In fact,

<sup>5</sup> Source: Association of British Insurers.

<sup>6</sup> Source: Association of British Insurers.

**Table 3.4** UK non-deposit-taking financial institutions – net acquisition of selected assets, 2002 (£m)

	PF	LTI	GI	UT	IT
Short-term assets	-7,816	-5,733	5,407	556	231
British government securities	52	5,322	-651	771	367
UK company securities	-7,050	17,637	580	8,020	-1,300
Overseas securities	12,240	12,495	-1,001	5,433	-1,384
Other	7,180	5,229	-1,478	679	202
<b>TOTAL</b>	<b>4,606</b>	<b>34,950</b>	<b>2,857</b>	<b>15,459</b>	<b>-1,884</b>

Source: From ONS (2004), *Financial Statistics*, January, table 5.3c. Crown copyright material is reproduced with the permission of the Controller of HMSO and the Queen's Printer for Scotland.

a broadly similar picture emerges from balance sheet data in Table 3.5. Long-term insurance companies had net assets worth £854bn at the end of 2002, compared with £97bn for general companies.) Compared with all other types of financial institution, long-term insurance companies were major investors in securities of all kinds, especially company shares, and their total asset acquisitions of £34.9bn in 2002 dwarfed all other institutions.

We noted earlier that the major legislation affecting insurance companies dates from the 1982 Act. This makes it an offence for anyone to conduct insurance business without authorization and resulted from concern following the collapse of a number of (general) insurance companies in the 1970s. The power of authorization lies with the FSA and is granted to each company with respect to particular classes of insurance business. In addition to providing authorization, the FSA subsequently monitors the performance of companies, particularly with respect to solvency margins, and has the power to intervene in a number of ways. It may require a change in investment strategy, prevent the renewal of existing policies or the issuing of new ones. In the event that a company should fail in spite of this scrutiny, policyholders have some degree of protection under the Policyholders' Protection Act, 1975. The 1982 Act also imposes regulations on advertising and promotion of insurance products and provides for a 'cooling-off' period. The fact that so many insurance products involve a savings element brings them also within the scope of the Financial Services Act, 1986.

### 3.5 Pension funds

In Section 2.4.3, we discussed pension systems in general terms and outlined the major different forms such systems could take. There, we emphasized the possibility that a system could comprise compulsory or voluntary elements or a mixture of both, the former being based on statute and the latter on private contracts. The UK pension system, at least as it has existed since the post-Second World War period, has contained elements of both types. In this section we examine the way this system has developed and consider the impact the major developments that have occurred have had on the role of pension funds.

The central compulsory element in the UK pension system is the 'first tier' or basic state pension scheme introduced in 1948. This places a statutory obligation to pay National Insurance Contributions (NICs) on employees whose pay exceeds what is termed the 'lower earnings limit'<sup>7</sup> as well as on their employers. Financed in this way by the current working generation's NICs (but also out of general taxation), the state pension is a PAYG, defined benefit<sup>8</sup> scheme, with entitlement to pension dependent on the individual's contribution record. Since inception, the state scheme has been coupled with a succession of means-tested arrangements providing additional types of financial support to the elderly. In the sense that such support is paid for out of taxation, it can be thought of as in many ways the economic equivalent of a compulsory, PAYG pension arrangement.

<sup>7</sup> With the exception of married women, who could opt out until 1978.

<sup>8</sup> 'PAYG', 'defined benefit' and the other pensions terms used in this section are explained above in Section 2.4.3.

From 1948 until the 1970s, the UK pensions framework could probably best be described as comprising two co-existing but unrelated systems. For, separate to, and in parallel with, state provision, a system of company occupational pension schemes operated and, in fact, expanded rapidly.<sup>9</sup> Such schemes were fully funded and, in the vast majority of cases, they were defined-benefit arrangements. They were also voluntary, at least on the part of employers, and existed to enable the latter to offer more attractive total remuneration packages to current and prospective employees.

The Social Security Pensions Act, 1975, created an economic linkage between these two systems. This statute established the State Earnings-Related Pension Scheme (SERPS). It thereby extended the compulsory element in UK pension provision, since membership of SERPS was made obligatory for employees in designated earnings categories and membership carried an obligation on employees and their employers to pay higher NICs. However, the Act allowed approved company occupational schemes to be ‘contracted out’ and employees in contracted-out schemes and their employing firms paid NICs at a correspondingly lower rate. Thus the Act introduced a new financial incentive encouraging the creation and continuation of company occupational schemes.

The next major milestone in the development of the current UK pension was the Social Security Act of 1986. This piece of legislation significantly altered the nature of the financial incentives created under the 1975 Act. That Act had permitted only defined-benefit schemes offering what it defined as a ‘guaranteed minimum pension’ to be contracted out of SERPS. The 1986 Act allowed defined-contribution schemes also to be contracted out and to attract a corresponding NIC rebate. In so doing, it accelerated the trend, already observable in the more difficult labour market conditions that had existed since the mid-1970s, for companies, especially newly established ones, to offer defined-contribution rather than defined-benefit schemes.

Even more significantly, the 1986 Act allowed employees to opt out of company schemes altogether. This paved the way for the emergence of the *personal pension*, a defined-contribution, contractual arrangement made between an individual, employed or self-employed, and an authorized intermediary (generally

an insurance company or a bank). Here the former’s contributions are invested by the latter to build up a personal fund on the individual’s behalf that becomes available for the purchase of a pension annuity when he or she retires. The NIC rebate that personal pensions attracted was set at a higher level than that available to occupational pension schemes. As we shall see, the expansion of personal pension provision has been perhaps the most notable – some might say, notorious – development in the UK pension field to have occurred since the late 1980s.

Some employers had traditionally made provision for employees to ‘top up’ the pensions they would receive under their company’s occupational scheme with AVCs, *additional voluntary contributions*. An AVC is a money-purchase arrangement by which employees can supplement the pension benefits accruing to them under occupational schemes. Since the 1988/89 tax year all occupational schemes have been required to provide facilities for employees to make AVCs. Usually this necessitates a contractual arrangement between the employer and an outside pension provider, an authorized intermediary who receives and invests the additional contributions employees make. The preceding year, 1987, saw a further new development, the introduction of FSAVCs (*free-standing AVCs*). Like company-organized AVCs, these are money-purchase arrangements. However, under an FSAVC, the employee enters into a direct contractual arrangement with a pension-providing intermediary: the employer is not involved at all.

A further chapter in the development of Britain’s current pension system was marked by the Welfare Reform and Pensions Act, 1999, which created the framework for the *stakeholder pension*, a new defined-contribution device introduced in the 2001/02 tax year. This Act placed an obligation on employers to provide access to a stakeholder pension scheme for employees who did not qualify for membership of an occupational scheme – for example, because membership of their company’s scheme was restricted to certain grades of staff or because no company scheme existed. The Act sets limits to the charges a stakeholder pension scheme can levy on members’ funds and facilitates transfer into and out of such schemes. Its underlying aim was to increase the take-up of funded pension provision outside the ambit of the state scheme among groups

<sup>9</sup> The proportion of employees covered by company schemes rose from 28 per cent in 1953 to 53 per cent in 1967 (Dilnot *et al.*, 1994).

in society that had been relatively excluded from such provision in the past.

A further point to note is that occupational schemes as well as personal and stakeholder pensions, AVCs and FSAVCs carry tax advantages for the contributing employee. While membership of occupational schemes was compulsory, before 1988, such advantages were probably of little economic significance. However, since that date, employees have had the right to opt out of any pension provision offered by employers, and tax benefits have therefore represented an inducement for employees to join or stay in company schemes or else to pay into personal pensions. Even more clearly, they are an incentive for employees to take the more active step of making voluntary contributions towards their future pensions, whether AVCs or FSAVCs.

The outline of the evolution of policy we have provided above suggests that the state has exerted an influence in three main ways: firstly, it has increased the legislative pressure on employers to provide funded pension facilities of one kind or another; secondly, it has extended the scope for individuals to enter into independent contractual arrangements with pension-providing intermediaries; thirdly, it has widened financial incentives likely to encourage the growth of funded provision.

Obviously, government policy in the area of pensions has been motivated by a desire to enhance the financial security of the elderly, currently and in the future. However, policymakers' concern in the last quarter of the twentieth century to reconcile this goal with the objective of restraining the growth of public expenditure is also evident in the character of successive pieces of legislation. It is clear too that the prevailing ideological climate, with its emphasis on individual choice and its preference for private over state provision, has had a fundamental impact on policy choice.

Stakeholder pensions represent an attempt to reflect all these concerns simultaneously. Moreover, conflicting policy goals and influences came to the fore in the mis-selling scandal that erupted over personal pensions in the mid-1990s and subsequently merged with a number of other incidents which called into question the merits of long-term savings products, as we shall see below.

In the fiscal year 2002/03, 51 per cent of the income of the average British pensioner household came from

state pension and other state benefits. Income from occupational pensions accounted for a further 27 per cent. These figures illustrate the continuing importance extending into the twenty-first century of the twin elements of the post-Second World War pensions framework: on the one hand the compulsory, PAYG, basic state pension plus supplementary means-tested state provision and, on the other, the network of funded, employer-organized, occupational schemes.

As we have shown, the UK pensions system has, since the post-war period, evolved in directions that have considerably enhanced the role of pension funds of all kinds. In 1997 the government committed itself to reinforcing this trend when it set a long-term target of 60 per cent as the proportion of overall pension saving to be achieved through private schemes. The sale of 840,000 stakeholder plans in the first 12 months of the existence of stakeholder pensions (the year to April 2002) seemed to be evidence of early success in moving towards this goal.<sup>10</sup> However, both on the stakeholder front and in relation to occupational pensions more generally, the more recent picture has been distinctly less satisfactory as far as the government's self-imposed '60 per cent' pensions target is concerned.

Considering stakeholder pensions first, take-up appears to have stalled since 2002, the Association of British Insurers reporting that total sales of personal pensions, including stakeholder pensions, had dipped below pre-stakeholder days by late 2003. Furthermore, even though nearly two-thirds of even the smallest firms were, by 2003, making some kind of pension provision for their employees, four out of five stakeholder schemes were found to be 'empty shells' – schemes which existed on paper but had no contributing members at all. There are concerns, too, that the level of contributions being paid into stakeholder schemes will prove too low in many cases to assure participants of decent pensions in the future. In this context it is worth noting that only 13 per cent of employers make contributions of their own to the stakeholder schemes they have set up.

In Section 2.4.3 we noted that investment risk in a defined-contribution (DC) scheme falls squarely on the employee, whereas in a defined-benefit (DB) scheme it is borne by the employer, at least in the first instance. With the end of the long stock market boom and the sharp decline in stock market indexes following the

<sup>10</sup> Pauline Skypala, 'Stakeholder pensions a success say ministers', *Financial Times*, 13 September 2003.



advent of the new millennium, investment risk has materialized in no uncertain terms for employers operating DB schemes. Faced with the prospect of having to raise their own contribution levels substantially in order to maintain the actuarial soundness of schemes, many have opted for more radical measures in addition.<sup>11</sup> The most common action taken has been to close schemes to new employees, a development that has been so rapid and far-reaching that only one in five DB schemes is now open to new entrants according to recent figures. Overall, whereas 24 per cent of employees of large companies were covered by DB schemes as recently as 2000, this figure had fallen to 16 per cent by 2003. Because the alternative for excluded workers is at best membership of DC schemes, which characteristically set lower contribution levels,<sup>12</sup> and because the proportion of excluded workers will continue to grow over time, this is clearly a worrying development for the government with its 60 per cent target.

The opening years of the new century have also been marked by some major new initiatives in state pension provision: the introduction of the State Second Pension (S2P) in 2002, the arrival of the Pension Credit in 2003 and the proposal before Parliament at the time of writing (May 2004) for a state-funded Pension Protection Fund (PPF). All three developments have been encouraged to a greater or lesser extent by the adverse features of the private pensions climate discussed in this section.

S2P, aimed at low and moderate income earners, has replaced SERPS as a contributions-based, government-run, supplement to the basic state pension.<sup>13</sup> Although S2P could be regarded as in some senses a competitor to the stakeholder pension, the two are in practice often complementary, many workers choosing to remain 'contracted in' to S2P even while contributing to their stakeholder pensions. In contrast, the Pension Credit is tax-financed and in no way contribution-dependent. Replacing the Minimum Income Guarantee (MIG), it is a means-tested benefit designed to ensure that the level of income of all members of the elderly population is brought up to a defined minimum. A novel feature of the Pension Credit is its *savings credit* component.

This rewards moderate levels of prior saving by offering additional benefit to eligible individuals. Finally, the proposed PPF will, if it passes into law, provide compensation to workers who lose their pension rights when closure of their employing firm results in the winding-up of the firm's occupational scheme. The PPF would be financed by a levy on pension funds in general.

Whether it is conviction or the pressure of circumstances that is the driving force behind these measures, their thrust arguably runs counter to the government's stated goal of increasing reliance on private pension provision, though to say this is by no means to question the desirability of the measures in themselves. S2P may prove in the longer run to be more of a substitute for, than a complement to, private provision. The means-tested Pension Credit may act as a disincentive to private saving despite the existence of the savings credit component. Finally, while the PPF may make a contribution to repairing damaged public confidence in the private pensions industry (an issue to which we return later in this section), the levy which supports it could well prove damaging to the financial health of pension funds in general. We now look more closely at the functioning of pension funds within the UK pension system whose evolution we have traced.

Turning first to occupational pension schemes, we may note that the trustees of any scheme must make two basic organizational choices. Firstly, they must decide who is going to administer the scheme, that is keep the records, collect the contributions, pay the pensions and so on. Either they will opt to keep these tasks under their own direct control, in which case the scheme will be *self-administered*, or they will pass them over to an external body, almost always a long-term insurance company. In that case the scheme is said to be *insurance-administered*. Secondly, the trustees have to decide who is going to manage the assets of the fund and in particular to determine its investment policy. Here again the choice is between managing the fund themselves, that is, operating a *self-invested* scheme, or allowing an insurance company to act as fund manager. An *insured* scheme is one where both administration and fund management is delegated to an insurance company.

<sup>11</sup> In a few highly publicized cases companies have chosen to disband their DB schemes altogether rather than meet the costs of making good the decline in the value of pension fund assets. We return to this issue below.

<sup>12</sup> A recent survey of small companies still operating DB schemes open to new members suggests that total employee and employer contributions in such schemes average 21 per cent of salary. The equivalent figure for DC schemes is only 8.6 per cent.

<sup>13</sup> Unlike SERPS, S2P extends opportunities to accrue benefits to individuals prevented from making contributions by caring responsibilities, illness or disability.

**Box 3.3 More to come after black week for insurers**

Deborah Hargreaves

It has not been a good week for insurers. First the Penrose report into the debacle at Equitable Life cast a shadow over the industry, raising further questions about mutual structures. Next, MPs issued a damning report on insurers' flawed selling of endowment mortgages in the 1980s and 1990s.

Disappointing results from Royal & Sun Alliance further spooked the market, its shares falling 15 per cent on Thursday. Also weighing on the sector was the announcement this week that Countrywide Assured, the estate agents chain, would demerge its life assurance arm. The move was an additional vote of no-confidence in the with-profits business.

While this week's reports were uncomfortable for the large insurers, their impact on investors is less clear. Shares in life assurers have outperformed the wider market since the eight-year low last March. But the public's crisis of confidence in their products and savings in general should make it harder for them to generate new business in future.

The decline of the once-venerable Equitable Life has seen many savers

penalised for their sensible decision to put aside money for retirement. Many have now lost part of their pension savings and the government is resisting calls for compensation.

At the same time, 5m people are facing shortfalls on endowment mortgages, with the average hole at £5,500. MPs have roundly criticised insurers for failing to flag the potential problems with these stock-market-related products, where the total shortfall is projected to be anything from £30bn–£100bn.

Endowments could still prove a financial headache for the large life offices that appear to have made few provisions for compensation. Norwich Union, which is part of Aviva, and Standard Life, the mutual, are most exposed since they have promised to make up part of any shortfall experienced by mortgage holders.

The promises are couched in careful language and their impact is difficult to assess, but under new regulations, the companies will have to show reserves put aside to deal with them. Thus far, fewer than 6 per cent of endowment policyholders have claimed compensation, but 50–60 per

cent believe they were missold, according to the Treasury select committee.

MPs have attacked the industry's record on keeping policyholders informed of changes that might affect their savings. The industry had focused on 'short-term sales with insufficient appreciation of its long-term duty of care to its customers', they said.

Certainly, insurers have been extraordinarily complacent about their captive customer base. With-profits funds lock in savings for long periods with penalties for early withdrawal – a good business model maybe, but disastrous for individual savers whose circumstances change.

These products have now been so discredited it is hard to see who will buy them. As savers realise that insurers' so-called smoothing technique was not enough to insulate them from a stock market downturn, they may prefer to take a more direct risk through a diversified investment fund.

Insurers have, in the past, used their massive with-profits funds to back up new business in less lucrative areas. But regulatory changes now make this more difficult.

Source: *Financial Times*, 13/14 March 2004.

Self-administered, self-invested schemes are predominantly large, often with many thousands of members and large enough to enable the economies of scale that would justify internal management to be achieved. In contrast, insured schemes are overwhelmingly small schemes with less than 1,000 members. Hence the role of insurance companies in the management of occupational schemes is a relatively minor one. With the advent of personal pensions, insurance companies have been able to expand their

activities in the pension field, particularly since only authorized insurance companies are allowed to provide the annuities which personal pension funds will eventually be used to purchase.<sup>14</sup> It is noteworthy that, in 2002, 60 per cent of the total premium income of the UK long-term insurance market was derived from pensions business (occupational and personal).<sup>15</sup>

As we noted in Section 2.4.3 projected rates of return on a pension fund's assets need to be sufficient to ensure that the scheme is at all times fully funded. In

<sup>14</sup> This is because annuities are regarded as long-term insurance business. In contrast, the management of pension funds is regarded as investment business under current regulations, which banks and building societies as well as insurers are allowed to carry on.

<sup>15</sup> Source: Association of British Insurers.

**Table 3.5** UK non-deposit-taking financial institutions – holdings of selected assets, end 2002 (£m)

	PF	LTI	GI	UT	IT
Short-term assets	20,794	44,958	2,899	8,041	0
British government securities	84,461	131,305	18,390	7,078	471
UK company securities	216,887	378,268	13,677	103,853	20,421
Overseas securities					
company	115,778	110,738	7,394	69,067	15,130
government	16,031	19,762	7,156	4,230	800
Unit trust units	36,530	65,267	1,685	0	47
Land, property etc.	31,658	52,658	805	0	532
Other	88,302	51,389	45,166	5,767	565
<b>TOTAL</b>	<b>610,441</b>	<b>854,345</b>	<b>97,172</b>	<b>198,036</b>	<b>37,966</b>

Source: From ONS (2004), *Financial Statistics*, January, tables 5.1b, 5.1a, 5.2a, 5.2d, 5.2c. Crown copyright material is reproduced with the permission of the Controller of HMSO and the Queen's Printer for Scotland.

the case of defined-benefit schemes, the responsibility to make good any shortfall rests in the first instance with the employer. Trustees of such schemes and, in particular, employer representatives amongst them, will therefore be concerned to ensure that the fund achieves healthy long-term returns. A decline in projected rates of return does not bring with it the same kind of threat of underfunding as a defined-contribution scheme. However, it does pose a threat to the value of the pension that currently contributing members will receive. The achievement of healthy long-term returns is therefore just as important an objective for defined-contribution schemes. In contrast, the flow of monies into and out of pension funds is, in the short run, regular and highly predictable. It follows that liquidity is not a significant factor in pension fund management.

These twin considerations go a long way towards explaining the composition of the asset portfolios of the pension fund (PF) and long-term insurance (LTI) sectors at the end of 2002 that are set out in Table 3.5. (Recall that, as we noted just a couple of paragraphs above, rather more than half of the business of the LTIs is in the pensions field.)

In both the PF and the LTI sector, short-term assets amounted to c. 5 per cent of the total at the end of 2002. This is hardly surprising, for such assets offer liquidity but generally low rates of return to their holders. On the other hand, more than half of the assets of both sectors consisted of UK company securities.

Again this is easily explained given that, in recent decades, high dividend growth and significant capital appreciation have combined to produce high levels of average yields on UK company stocks. Holdings of overseas securities accounted for more than 14 per cent of LTI assets and nearly 18 per cent of the assets of the PF sector. Once again, the pursuit of higher returns is part of the explanation here. However, fund managers have also invested abroad to achieve greater stability in returns through diversification. For while stock market indexes in different financial centres tend to move broadly in line with one another, the correlation is less than perfect.<sup>16</sup>

By the opening years of this century, it was widely recognized that long-term contractual saving in the UK, largely the province of life assurance and pension funds, was in serious trouble. At the core of the problem was the failure of many people to make the necessary arrangements to provide themselves with an adequate income in old age. The rule of thumb adopted by the pensions industry is that people should aim for a net pension of approximately two-thirds their net pre-retirement income, though one should note that given the way the UK tax system affects retired people, this would be achieved with a gross pension equal to about one-half of gross earnings. The extent of the long-term savings problem, together with some recommendations for tackling it, were the subject of the 'Sandler Report' in 2002.

<sup>16</sup> See Section 8.3 for an explanation of why diversification of asset portfolios can reduce risk even where returns are positively correlated, so long as the correlation is not perfect.

Looking at the causes of the problem, we can identify four factors, each of which played a specific role, but we should always remember the background that we explored in Section 2.4.3, where we commented on the tendency of many people to focus on the present at the expense of the future – ‘financial myopia’ as we called it – with the result that they would probably undersave.

The first problem originated with the government’s decision in 1988 to encourage people to opt out of the State Earnings-Related Pension Scheme (SERPS), and out of employers’ schemes if they so wished, and to make payments into a personal pension scheme. This was to be achieved largely by opening up pension provision to a wide range of financial intermediaries. The arguments in favour of increasing private provision were twofold. The first derived from demographic changes. With falling birth rates and increasing longevity, the dependency ratio would rise in the twenty-first century to a point where, it was argued, PAYG schemes would pose an unacceptably high burden on taxpayers. The second was an argument about economic efficiency. The way in which most employers’ occupational schemes functioned discouraged worker mobility because it was difficult to transfer pension rights from one firm to another.

The end result of the government’s action was an outbreak of high-pressure selling of private pension schemes which persuaded many workers to quit their

occupational pensions. For many people this turned out to be a mistake, principally because in an occupational scheme the employer would make a contribution on behalf of each employee. By 1996 it was estimated that some 500,000 people had been sold personal pensions which put them in a worse position than if they had remained in their occupational scheme. The then regulatory body, the Securities and Investments Board (SIB), ordered that the victims must be found and compensated. But in February 2001 the Financial Services Authority, the new regulatory body, estimated that only 200,000 had actually received compensation (amounting to £2.2bn). Progress continues but is very slow and it is quite likely that the difficulties in getting compensation have done more to reduce investors’ confidence in the financial services industry generally than the original mis-selling.

The trouble that began with PAYG schemes in the 1980s spread to funded schemes at the end of the 1990s. We have seen that the difference between a defined-benefit (DB) scheme and a defined-contribution (DC) scheme is that in the former the employer is committed to paying the specified benefits whatever that may cost. During the 1990s, with rising stock markets, pension funds often built up a ‘surplus’ of funds over and above what was likely to be needed to pay the defined benefits in the foreseeable future. In these circumstances some firms gave themselves a ‘pensions holiday’ by suspending payments into the fund. With the sharp fall

### Box 3.4 FT Money – Mis-selling: Scandal dates back to Conservative era

By Alexander Jolliffe



Pensions mis-selling left thousands of investors losing valuable old age savings and the insurance industry picking up £14bn bill, writes Alexander Jolliffe.

The scandal arose after the Conservative government introduced personal pensions in 1988, presenting them as a flexible alternative to occupational pension schemes. Life assurers saw a sales opportunity and their salesforces – who received big commissions – sold pensions to more than 1m people, including many nurses, miners and teachers.

Philip Skottowe, an actuary at New Bridge Street Consultants, says investors bought the pensions because they believed salesmen who said the new investments were more flexible than occupational schemes. Also, ministers ran TV adverts backing the pensions: ‘There was government endorsement’, he says.

In many cases the pension sales were cases of mis-selling – bad financial advice which led to losses. By leaving occupational pension schemes or not joining them, employees lost employers’ contributions and the security of final salary funds.

When the mis-selling emerged the City regulator launched a review of personal pension sales in December 1993. It examined 1.6m cases and 1.1m investors received compensation worth a total of £10bn.

In addition, the regulator examined mis-selling of top-up pensions known as free-standing additional voluntary contributions. It looked at 100,000 cases and more than 85,000 people received £250m-worth of redress.

Source: *Financial Times*, 20 September 2003.

in share prices in 2001 and 2002, however, the picture changed dramatically and some firms found that they faced pension funds deficits. This was made worse by a new accounting procedure (FRS17) that required the deficit/surplus to appear on a firm's balance sheet. The result, as we noted above, was that firms began to close their DB schemes to new employees, offering them only DC arrangements. This was bad enough for new employees but what attracted public attention was the decision by a few firms (the shipping firm Maersk was the first) to impose the switch on workers already contributing to a DB scheme. This was widely seen by the general public as a breach of faith (even though it was not actually illegal). Once again, the term 'pension' had got itself attached to some very negative publicity.

The end of the long stock market boom in 2000 lay behind yet another problem: it coincided with what now looks like an era of low inflation with correspondingly low interest rates. The combined result has been that investment funds which had grown at average rates of c.15 per cent from the mid-1980s suddenly ceased to grow or grew only very slowly. Consequently, many savers who had taken out long-term savings schemes with a view to achieving a target level of wealth by a specified date found that they would be disappointed. Of course, one might argue that savers who felt disappointed were suffering from 'money illusion'. Their nominal wealth had grown more slowly but their real wealth had benefited from the slow rise in prices.

The problem which could not be cured by removing money illusion arose in those cases where people were saving in order to repay their mortgage loan on a specified date. These 'interest-only' mortgages were designed to be repaid from the proceeds of an endowment life-assurance policy. Contributions (fixed for the life of the policy) were set by the insurance company at the beginning of the contract and were set in line with the past experience of nominal investment returns so as to achieve a target value when it terminated on a set date. The way in which many of these endowment policies were structured ('with profits') required the insurer to add a fraction of its investment returns to the value of the policy each year. This was then supplemented by an additional or 'terminal' bonus paid on maturity. This meant that a 25-year endowment policy, maturing in 2002, for example, would have the benefits of many years of good annual bonuses. Nonetheless, terminal bonuses played such a large

part in the final payout that a policy maturing in 2002 would have paid only about two-thirds the amount of a similar policy maturing before the crash, in 1999.

The consequence was that even savers with endowment policies nearing maturity in the early twenty-first century suddenly discovered that their fund would not be sufficient to settle their mortgage debt when the obligation fell due. For those savers without the benefit of many years of high returns, the situation was even more bleak. The problems became public when the FSA required life companies to begin sending out warning letters after 2001. Many savers claimed that they had no idea that their endowment policies exposed them to stock market risk. If true, this amounts to another case of mis-selling. But true or false, coming on top of the earlier issues, the 'with-profit endowment' problem further undermined the reputation of the long-term savings industry. As the *Financial Times* extract in Box 3.3 reported, in March 2004 only 6 per cent of endowment policyholders had actually claimed compensation, but 50–60 per cent felt they had a justified grievance.

Finally, at least at the time of writing, there was the case of the Equitable Life Assurance Society. Equitable Life was a very old and highly regarded mutual life assurance company. Its products were regarded as some of the best in the business, producing returns which put the company always near the head of the league tables. Over the years it had built up a clientele which was skewed towards the professional classes and many in public life, including members of parliament and the judiciary, owned pension or other long-term savings products with Equitable Life. In his report, which finally appeared in 2004, Lord Penrose dated the origin of Equitable's problems to policies adopted by its management in the 1980s to pay out the maximum bonuses consistent with what were thought at the time to be the minimum safe level of reserves. What first alerted the public to a problem with the society, however, was the outcome of a decision in the 1970s to offer a guaranteed minimum income from annuity policies. This guarantee was given when, as we have seen, nominal returns were good (comfortably above the guaranteed level) and neither the company nor its clients gave much thought to the possibility that the guarantee would ever be called on. But during the 1990s, with signs that inflation and interest rates were falling around the world, the society had to face the risk that at some time in future the company would not be able to meet the guarantees. Its solution

(decided in 1995 but not made public until 1998) was to cut the bonuses that it paid to those savers who had a guaranteed annuity policy so that, although the guaranteed *rate* would be paid, it would be paid on a smaller sum than would be available to those without the guarantee. As a result all clients would get the same returns and Equitable would be safe.

Unfortunately, after a series of legal actions, the House of Lords ruled this practice illegal in 2000. This forced the company to close to new investors, to switch its investment portfolio largely into safe but low-yielding bonds and to impose penalties on investors who decided to terminate their policies early rather than accept the future poor returns. Even these measures were not sufficient to ensure the survival of the society and, in March 2004 when Penrose reported, the outlook was very uncertain.

Given the professional nature of Equitable's client base, it is not surprising that a number of action groups were formed with a view to trying to get compensation for investors. This ensured that the plight of Equitable Life remained in the headlines in the following years. Then, when Lord Penrose's report drew attention to the very poor record of supervision by a succession of regulatory bodies (they had known, he said, about the guarantee problem since 1993 but had done nothing to check on how the society was going to deal with it), savers once again got the message that long-term saving, even with one of the most venerable financial firms in the UK, was a highly risky business.

### 3.6 Unit trusts

As we said in Chapter 2, unit trusts are examples of 'open-ended' trusts, in the sense that net investment into the trust means that the managers can create more 'units', buy additional assets and thus enlarge the size of the underlying fund.

The first unit trusts appeared in the UK during the 1930s. By the outbreak of war in 1939 there were about 90 trusts managed by 15 companies. The number of trusts (and management companies) grew slowly until the 1960s when it expanded very rapidly, falling back again in the 1970s and taking off again in the 1980s. These growth rates broadly coincided with trends in UK stock prices. In the mid-1980s the value of funds was about £20bn. By 2000 this figure had increased elevenfold to about £220bn.

The attractions to investors are several. Firstly, a 'small' saver is able to reduce risk by investing quite cheaply in a much wider portfolio of assets than would be the case by buying securities directly. The unit trust company, in other words, is exploiting the market imperfection which is the economy of scale available in securities trading. Secondly, holdings can be liquidated very quickly. In Chapter 17 we note that securities trading in the UK is divided into fortnightly account periods and accounts are settled only after the end of each period. By contrast, the holder of units in a trust can sell the units back to the managers and receive payment, normally within 10 days. Notice that units can only be traded between the investor and the trust manager. There is no secondary market.

Each trust is always the responsibility of two companies. Firstly, there is the company responsible for day-to-day management of the trust (the **trust manager**). This may be a specialist unit trust management company or it may be part of some larger financial grouping. We saw in Section 3.2, for example, that retail banks have their own unit trust management companies. The management company makes the detailed investment decisions, issues certificates of ownership, pays income to investors and so forth.

In addition, each trust has a **trustee**. These are mainly specialist subsidiaries of major banks. The job of the trustee is to see that the fund is managed within the terms of its trustee deed. This deed specifies the objective of the trust and lays down broad conditions governing the management of the funds. The trustee company is acting to some degree as guardian of the investors' interest.

There are of course expenses involved in the running of unit trusts: the management company and the trustees are entitled to reward for their services. For the management company, income derives from two sources. Firstly, there is the 'spread', the difference between the *bid* (the trust's buying) and *offer* (the trust's selling) prices. Unit trusts are permitted to operate a spread as wide as 15 per cent of the fund's net asset value. On a central value of £1, for example, the bid price could be as low as 93p while the offer price could be 107p. However, competition between management companies keeps the spread closer to 6–7 per cent (97–103p). In addition, the management company is entitled to charge an annual management fee of 0.5–1 per cent of net asset value. This is normally deducted from the fund's investment income before deciding upon the distribution to be

made to unit holders. The trust company receives an annual fee, normally calculated as a very small proportion of the trust's net asset value.

Box 3.5 shows data for the group of unit trusts managed by Scottish Investment Fund Managers Ltd. The data was taken from the *Financial Times* of 13 March 2004. Reading from the top, it shows the name of the management company and its address and telephone number. It also shows, in the expression '(1200)F', the time of day at which the units are revalued and indicates that the managers will normally deal at 'forward prices' (F), that is to say at the prices which prevail at the *next* valuation after the receipt of buy/sell instructions. The first column gives the abbreviated name of each trust, which tells investors something about the objective of the trust or the geographical area in which it invests. The first column of figures shows the management company's initial charge (the spread in percentage terms). The next two columns show the latest bid-offer prices and the next column shows the change in value of the units since the previous day's valuation. The final column shows the gross yield (the dividend (or coupon) divided by price).

In recent years, many unit trusts have converted to 'OEICs'. OEIC stands for 'open-ended investment company'. This is a variation on the unit trust type of fund management in the sense that it preserves the fundamental feature of unit trusts, namely that they are open-ended. The main difference is that an

OEIC is structured as a company, rather than a trust, and 'units' are replaced by 'shares'. It is doubtful that savers are aware of these differences and many unit trusts have converted to OEICs since 1997 with no impact at all on their savers. The noticeable difference is that the pricing of OEICs allows only one price to be quoted: the buying and selling prices are the same and this simplification for savers is usually given as the main reason for conversion from unit trust to OEIC. Given the single price, it follows that managers cannot draw income from the bid-offer spread and have to take it from the income of the fund. OEICs themselves are not a novelty; they have been the standard form of open-ended mutual fund in continental Europe for many years.

Table 3.5 shows just how strongly, in relation to their total investible funds, unit trusts are concentrated in equities. This explains what we said at the beginning of this section, namely that the growth in unit trusts (both asset values and numbers of clients) varies with stock market performance. Thus the creation of new units virtually ceased after the crash of 1987, but began again within a year. Growth in the 1990s averaged about 18 per cent per annum, though this included a year of negative growth in 1994. Total assets at the end of 1995 were £112bn, so that Table 3.5 shows that their assets nearly doubled in value in the seven years to 2002.

One of the reasons for the rapid growth of unit trusts as a form of saving during the 1990s was the encouragement offered to 'small' savers by UK governments. This began with Conservative governments offering savers relief from both income and capital gains tax on equities and unit trusts held in a *Personal Equity Plan*. One such plan could be taken out in each tax year and the amount that could be invested in it was £5,000. The Labour government which took office in 1997 replaced 'PEPs' with 'ISAs' or *Individual Savings Plans*. These managed to combine increased flexibility with additional complexity, but the principle remained the same: up to a fixed annual amount (£7,000) per year, savers could protect their investments from both income and capital gains tax.

The intermediary role of unit trusts is, strictly speaking, limited to their purchase of newly issued equities (or bonds). This is always the case where tradable assets are concerned. Whether the assets are being bought by an individual or an organization, the only act that transfers funds from a lender to a borrower is the purchase from the borrower of his or her *newly issued*

**Box 3.5****Scottish Mutual Inv Mngrs Ltd (1200)F****(UK)**

301 St Vincent St, Glasgow G2 5HN 0141 248 6321

**Authorised Inv Funds**

UK Equity Inc .....5 <sup>1</sup> / <sub>4</sub>	357.5	379.9	+0.10	1.82
Do Accum .....5 <sup>1</sup> / <sub>4</sub>	533.6	567.1	+0.10	1.82
UK Smllr Cos Eq Inc. ....5 <sup>1</sup> / <sub>4</sub>	242.1	257.5	-0.50	1.31
Do Accum .....5 <sup>1</sup> / <sub>4</sub>	327.0	347.8	-0.50	1.31
European Inc .....5 <sup>1</sup> / <sub>4</sub>	565.6xd	598.6	-2.40	1.25
Do Accum .....5 <sup>1</sup> / <sub>4</sub>	686.4	726.5	-3.00	1.25
Far Eastern Inc .....5 <sup>1</sup> / <sub>4</sub>	135.2xd	143.8	-1.00	1.04
Do Accum .....5 <sup>1</sup> / <sub>4</sub>	170.3	181.1	-1.20	1.04
Japanese Inc .....5 <sup>1</sup> / <sub>4</sub>	43.32xd	45.98	-0.59	0.00
Do Accum .....5 <sup>1</sup> / <sub>4</sub>	45.41	48.19	-0.61	0.00

Source: *Financial Times*, 13 March 2004.

**Table 3.6** UK non-deposit-taking financial institutions

Turnover of selected securities, 2002 (£m)					
	PF	LTI	GI	UT	IT
Listed UK ordinary shares	169,597	122,450	9,485	98,633	21,290
Other listed UK company securities	31,263	124,892	8,642	22,522	645
Overseas ordinary shares	163,573	90,580	1,168	122,365	21,264
Other overseas company securities and government securities	61,632	103,865	19,718	20,406	2,276

Source: From ONS (2004), *Financial Statistics*, January, tables 5.3a. Crown copyright material is reproduced with the permission of the Controller of HMSO and the Queen's Printer for Scotland.

liabilities. All other transactions simply involve the reassignment of previous loans. Unit trusts are important actors in the primary markets but their purchases of newly issued UK company shares (for example) is dwarfed by both their *total* net acquisitions of UK equities (newly issued plus existing) and by their total *turnover* (total sales and purchases) of equities. As Table 3.4 shows, unit trusts made net purchases of UK equities amounting to about £8bn in 2002 against a background (Table 3.6) of total buying and selling of UK equities amounting to about £120bn or 60 per cent of their total portfolio.

We noted in the last chapter that open-ended funds are generally more expensive to run than closed-ended funds. This is inevitable, since savers' desire for more investment in unit trusts means that managers have to buy additional securities while a desire for units means that funds are withdrawn from the fund and the managers have to respond by selling assets. This is why, in the mid-1990s, unit trust management companies started looking for ways of reducing costs in a sufficiently dramatic way that 'low cost' could be made part of their marketing. It coincided also with a more analytical approach to the assessment of mutual fund performance in the popular financial media. What this analysis showed, again and again, was that most managed funds failed to beat the returns that would have been available to savers if they themselves had simply constructed a miniature portfolio replicating one or other broadly based share index. Holding a replica of the FTSE-100 index (i.e. a portfolio of the largest firms), or the FTSE-350 or the 'All-share', would have given better returns than holding units in many professionally managed funds. This discovery is entirely consistent with the efficient market hypothesis which broadly says that share prices incorporate all relevant

information so rapidly that no-one has an information advantage which enables them to sniff out bargains. Attempts to do so simply add to costs. Indeed, examining the performance of mutual funds is one common way of testing the EMH and these tests have shown repeatedly that there is rarely any advantage to professional management (see Section 26.4).

When eventually the financial press caught up with this and suggested that investors might do better to 'hold the index', some management companies responded by creating funds which did precisely this. Thus emerged the so-called 'tracker funds' whose purpose was simply to earn the return that would be earned by a portfolio constructed to replicate a specific index. Such a fund, in theory at least, could not do worse than the index on which it was based and, since performance against the index was a popular measuring rod in the financial media, the managers would be spared the humiliation of failing to beat the index.

Furthermore, there was the advantage that 'tracker' funds would be relatively cheap to run. They could not remove the fundamental disadvantage of open-ended funds, that inflows and outflows required asset purchases and sales, but they did remove any need for expensive research and analysis about which assets to buy and sell. The index dictated what shares should be in the fund and in what proportions: the manager had simply to buy and sell across the whole fund in order to keep its constituents in line with the index. A computer could do it, and in many cases did.

Tracker funds turned out to be one of the most popular innovations of the mutual fund industry during the 1990s by giving retail investors who wanted a diversified exposure to equity returns a rate of return which matched that of the stock market as a whole at lower cost (and no less success) than had been



previously possible, at least from unit trusts. Just how safe it was, of course, depended upon the degree of diversification. Tracking the FTSE-100 index meant holding a portfolio of shares in the one hundred largest UK companies. Conventional wisdom has always suggested that most of the risk-reducing benefits of diversification can be obtained by holding about 20 different assets, *provided that they are genuinely diversified* (see Section 8.3). A potential problem with tracking an index was illustrated in 2000. This was the year of the ‘dotcom’ boom when the market value of many technology companies gave them a capitalization that put them (temporarily) amongst the UK’s largest one hundred firms. Thus they were included in the FTSE-100 index which became rather heavily skewed towards technology companies and was consequently rather undiversified. When the technology mania ended in the summer of 2000 and the FTSE-100 fell quite sharply as a result, investors in funds which tracked a broader based index, like the FTSE-350 or All-share, had reasons to be thankful.

### 3.7 Investment trusts

Investment trusts differ from all the other institutions we have discussed in this chapter in a number of significant ways. The chief of these is that while all previous intermediaries are ‘open-ended’, investment trusts are ‘closed’. By open-ended we mean that any number of savers can lend any volume of funds to the intermediary at any time. Any increase in the demand for the liabilities of open-ended intermediaries means that more funds are potentially available to ultimate users.

In the case of investment trusts, however, what savers buy is shares in a trust which is, in effect, a firm whose business it is to own stocks and shares. At any moment, the number of shares in the trust is fixed. Thus new savers can buy shares only from existing shareholders and so when we speak of a flow of funds into investment trusts we must recognize that extra funds do not go into the trust at all. There is no increase in lending by the trust to ultimate lenders. All that happens is that the market price of the shares rises.

The fact that an increase in the demand for an investment trust’s shares does not mean that more funds are made available to ultimate borrowers raises the question of whether investment trusts should be

considered as intermediaries at all. Intermediation, the transfer of funds between ultimate lenders and ultimate borrowers, requires that two conditions are met. The first is that funds flow from savers into the trust; savers’ decisions must make a change to the funds available to the trust. The second is that the trust passes these additional funds to a borrower; in practice, the trust must use the funds to buy liabilities newly issued by borrowers (this is the same condition that we met with unit trusts in the last section). These two conditions *could* in principle be met. It could be the case that the investment trust company makes a new issue of its own equities (or bonds) and uses the additional funds to buy equities (or bonds) *newly issued* by another firm. The point is, however, that this coincidence is far from the norm. Investment trust companies will sometimes make new issues to expand their capital base and they will sometimes buy securities newly issued by borrowers. But most of the time the first link fails in the sense that a decision to switch savings ‘into’ an investment trust means simply buying its existing shares (no new funds are made available to the trust) while the second link fails because most of the time the IT company itself buys existing securities (no new funds are passed on to borrowers).

Investment trusts’ claim to intermediary status rests primarily upon the fact that (like unit trusts) they are active in the primary market. When firms raise new capital, investment trusts are among the institutions who will subscribe. However, while Tables 3.4 and 3.5 show that equity holdings are very important to investment trusts, they also show that the investment trust sector is very small when compared with the other financial institutions.

While ‘channelling funds’ is the obvious sense in which any institution can claim intermediary status, we should never lose sight of the fact that activity in the secondary market makes a subsidiary but important contribution to the lending/borrowing process. An active secondary market for *existing* securities gives such securities a liquidity which makes them more attractive to investors and thus lowers the dividends that issuers have to pay in order to induce lenders to buy them. The more liquid the market, *ceteris paribus*, the lower the cost of capital to firms.

As we have already said, investment trusts are not trusts at all in the strict sense of the word. They are simply firms whose business happens to be the trading of securities. This is reflected in both the way that investment trust companies are regulated and the

way in which their share prices are quoted. Like other publicly quoted firms they are subject to the full range of Companies Acts and to the regulations that the London Stock Exchange imposes upon firms wanting a stock exchange listing. Finally, the Inland Revenue ‘approves’ investment trusts for purposes of tax treatment (principally their exemption from capital gains tax on their sales of securities).

The history of investment trusts predates that of unit trusts by quite a long way. The first to be established was the Foreign and Colonial Government Trust in 1868. As the name implies, the purpose of this particular trust was to enable UK investors to get access to the returns from overseas government bonds which generally paid higher rates than were available on UK government bonds. In fact, the higher returns available from overseas investment, especially in the period before 1914, was a major driving force behind the early growth of investment trusts and it remains true even today that investment trusts tend to be more outward looking than unit trusts. In spite of this early start, it is clear from our tables that the investment trust sector has grown much more slowly than the unit trust movement, in spite of their cost advantage. The reasons for this are not entirely clear. One reason may be the fact that investment trust share prices need not be a precise reflection of the value of the underlying assets. As we saw in Chapter 2, the value of one’s holding in an investment trust company depends immediately upon the demand for its shares and this is only indirectly linked to the value of the underlying assets. In fact, Box 2.4 shows that investment trust shares are often priced at a discount and this may create an unfortunate impression amongst retail investors, though in fact it means that the underlying assets can be purchased more cheaply through an investment trust than if they were bought directly. And what really matters to the investor’s return is whether the discount changes. For a constant rate of discount, investment trust shares will move directly with the value of the underlying assets.

The fact that investing in investment trusts involves buying company shares may also have played a part in limiting their retail appeal. The advantage of buying unit trusts is that one deals with the managers directly, by picking up the phone or filling in a coupon in a newspaper. Until recently buying investment trust shares meant dealing through a stockbroker which many savers would have found off-putting. In the last few years, investment trusts have worked hard at

marketing their shares to small savers, with television and newspaper campaigns, and now offer their shares directly to the public.

Since investment trusts are simply limited public companies whose job is to hold and trade firm and government securities, it is hardly surprising that their share prices are listed in the same way as those of any other quoted company. In the *Financial Times*, for example, they appear with all other shares, on the ‘London Share Service’ pages in a category headed ‘investment companies’. A minor difference from other share prices is that the ‘yield’ and ‘P/E’ columns (see Section 17.5) are replaced, for investment trust shares, by ‘NAV’, standing for ‘net asset value’, and ‘dis/pm’. NAV shows what the share price should be if it were to match the value of the underlying assets and ‘dis/pm’ calculates the difference between the actual share price and NAV as a percentage of NAV. From what we have said above, it will be appreciated that most investment trust shares show a negative figure (for discount) in this column.

### 3.8 Summary

A financial system consists of a set of markets, institutions and their ultimate users. As a result of competition, improving communications technology and a general movement towards deregulation of economic and financial activity, systems are becoming increasingly homogeneous. However, some differences still remain and these are reflected rather more in institutions than in markets.

A common practice is to divide institutions into those that take deposits (often included in official measures of ‘money’) and those that do not. In the UK, we need further to divide deposit-taking institutions into banks and building societies. In their main activities, there are considerable similarities between retail banks and building societies, though the former have greater freedom in both sources and uses of funds. Partly for this reason, some larger building societies are considering converting to banks and becoming subject to banking rather than building society regulation.

Bank (and building society) assets consist overwhelmingly of non-marketable loans supplemented by a small proportion of short-dated, highly liquid government securities. The bulk of company securities, and of longer-dated government bonds, are held by

non-deposit-taking (or ‘other’) financial institutions. This is because (with the exception of general insurance companies) their liabilities are held largely as long-term savings products by the public who want

protection from inflation and a share in the real growth of the economy. For this they are prepared to accept some degree of risk that their savings will fluctuate in value over time.

### Key concepts in this chapter

Net acquisitions	Long-term insurance	Trust manager
Turnover	Term insurance	Trustee
Stocks held	Annuity	Open-ended fund
Off-balance-sheet activities	Endowment	Closed-ended fund
Mutual society	Fully funded	
General insurance	‘Pay as you go’	

### Questions and problems

- 1 Explain how deposit-taking institutions differ from other financial institutions in their sources and uses of funds.
- 2 Distinguish between a ‘mutual’ and a ‘joint stock’ (plc) enterprise. List some of the advantages of conversion from mutual to plc status.
- 3 What are the major differences between UK general and long-term insurance companies and why do they exist?
- 4 Identify the major legislative changes that have had an impact on pension provision in the UK since 1948. Comment on their objectives and major effects.
- 5 Explain carefully the composition of the asset portfolios of the UK pension fund and long-term insurance sectors by reference to the objectives and problems of pension fund management.
- 6 Distinguish between a ‘funded’ and a ‘pay-as-you-go’ pension scheme. How would you expect the market for ordinary company shares to be affected by a general switch from PAYG to funded schemes?
- 7 Distinguish between the ‘net acquisition of assets’, ‘turnover in assets’ and ‘holdings of assets at end of period’. What might you expect about their likely size relative to each other?

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[www.bankofengland.co.uk](http://www.bankofengland.co.uk), *Bankstats* [table B1.2 (t3.1), table B1.3 (t3.2)]

[www.bankofengland.co.uk/mfsd](http://www.bankofengland.co.uk/mfsd)

Association of British Insurers, at [www.ABI.org.uk/industry](http://www.ABI.org.uk/industry)

[www.dwp.gov.uk](http://www.dwp.gov.uk)

[www.fsa.gov.uk](http://www.fsa.gov.uk)

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## Chapter 4

# The US financial system

### *What you will learn in this chapter:*

- The organization of the US banking system
- The relationship between US bank legislation and the development of the banking system
- The reasons for the large changes in the structure of the US banking sector in the 1980s and 1990s
- The reasons for the Savings and Loans crisis of the late 1980s
- The nature of the US central bank system
- The nature of non-depository financial institutions in the USA

## 4.1 Introduction

The US financial system is often grouped with that of the UK as a market-based system, indicating that the finance of firms comes largely from the issue of securities, and thus via markets. In fact, in some periods, the net contribution of bond and equity issues to corporate finance has not been particularly high and has certainly been lower than that in the UK. Nonetheless, it remains true that Wall Street (the location of the New York Stock Exchange) is central to the US financial system both psychologically and in terms of its influence on economic policy.

The psychological importance of Wall Street stemmed in part from the role of securities markets in the financing of firms during the period of the USA's most rapid growth; but in part also from the image that the USA had of itself as a young, confident, risk-taking nation in which almost anyone could become rich overnight. The stock market became the focus of one element of the American dream. The sharp price rises on Wall Street in the 1920s and the crash in 1929 are widely accepted as indicators of the economic boom and the subsequent worldwide depression of the 1930s. Commodities markets first developed in the USA, as did trading in futures, financial futures and options. US markets in these instruments remain the world's largest. The 'get rich' aspect of financial markets has remained important as shown, for instance, by the junk bonds scam of the 1980s (discussed in Box 4.4).

Although the role of securities markets in providing finance to industry has declined, the importance of the stock exchange in the lives of average Americans has increased since the 1970s with the growth of mutual funds and the development of pension funds. This was caused partly by the limitations imposed by law on the US banking system and partly by the increased volatility of inflation and interest rates in the world economy in the 1970s. Banking laws and the attitudes that gave rise to them have thus played an important role in the development of the system as a whole and, like all national financial systems, that of the USA is highly individual. Comparisons can, of course, be drawn and there are ways in which the US system has more in common with that of the UK than with that of, say, Germany. One example of this is the strength of securities houses which concentrate on business lending and investment activity. However, there are many ways in which the US system is dramatically different from that of the UK.

The importance of the US financial system to economic policy is not recent. For example, it is widely held that the contractionary policies of the US Federal Reserve System in 1928 contributed significantly to the onset of the Great Depression. These contractionary policies were introduced specifically to curb stock market speculation. There was an echo of this same concern in the early months of 1997 when the Governor of the Board of the Federal Reserve, Alan Greenspan, commented unfavourably on speculative activities in financial markets, prompting fears among market practitioners of increases in interest rates. Greenspan was again very critical of the apparent speculative excesses in the short-lived boom in high tech and dotcom companies in the first half of 2000.

The size of the US economy and the continued dominance of the dollar in international transactions has meant that the US financial system has become central not only to the US economy but also to the global economy. Financial markets in all countries pay great attention to the ups and downs of the Dow Jones Industrial Average index and to the NASDAQ index.

## 4.2 Deposit-taking institutions in the USA

The US banking system has a number of characteristics that distinguish it from those of other countries. Firstly, there are a very large number of banking organizations. Although the number of banks has fallen sharply in recent years, particularly through mergers and acquisitions, there remained at the end of 2003 a total of 7,769 commercial banks. Secondly, until recently, legislation limited the growth of US banks and their ability to expand from their home states to other states within the country. The restriction on expansion within the USA was one of a number of reasons for large banks from the financial centre, New York, choosing from the 1960s on to establish branches offshore, and playing a major part in the development of the Eurocurrency markets. Thirdly, there is a dual system of licensing, with banks being chartered by both the federal government and individual states. Fourthly, for a significant part of the twentieth century, other restrictions on the operation of banks were in force, limiting interest payments on deposits and providing for a strict separation of investment banks from commercial banks. Finally, a central bank was not established until 1913 – although

there had been two much earlier attempts to do so. The central bank that was then established was not a single institution but a system of 12 Federal Reserve Banks overseen by a Board in Washington DC.

Most of these characteristics can be explained by two major fears within the USA – the fear of centralized authority and the fear of domination by moneyed interests. These fears reflect the origins of the US nation state – settlement from Europe had been by separate, relatively small groups often fleeing from religious or political domination. The first significant united action by settlers was the struggle against the distant authority of Britain. The two fears combined to produce a determination to prevent the financial system being controlled either by large institutions in the financial centre of New York or by political forces concentrated in Washington. This led to severe geographical restrictions on the development of US banking, to the extent that banks were not permitted to have branch offices. The result of this was the continued existence of a very large number of banks, most of them small. It was only in the 1970s and particularly the 1980s and 1990s that this structure began to change.

The limitations on the development of banks, together with a general distrust in the population of financial institutions, left the system vulnerable to **bank runs** on individual banks. These frequently developed into **multi-bank panics**. Fourteen such panics have been identified in the years between 1800 and 1933, 11 of which led to widespread restriction of convertibility of deposits into currency. This strongly influenced the nature of bank legislation and this, in turn, had a marked impact on the way in which the system developed. Laws passed during the 1930s sought to restrict what was seen as damaging competition among banks, to prevent firms from engaging in a mixture of banking and non-banking business, and to provide a system of insurance of bank deposits. Ironically, the system that had been developed to limit the number of bank failures and to provide greater security for depositors was held by many to be largely responsible for a new wave of failures in the 1980s and early 1990s.

#### 4.2.1 The classification of US depository institutions

Classification of the US banking system is complicated by a number of the system's features. Firstly, there is the dual nature of the chartering system with banks

being granted licences to operate either by individual states (**state-chartered banks**) or by an agency of the federal government (**national banks**). States used their power to charter banks to restrict the ability of banks to open branches even within their own states and virtually to prevent cross-border activities of banks by not allowing those chartered in other states to open within their borders. National banks were prevented from opening branches until the *McFadden–Pepper Act* of 1927 when they became subject to the banking restrictions that applied to state-chartered banks in the state in which they were operating.

A second distinction arises because of the deposit insurance provisions of banking law. Although the first insurance fund to protect depositors was set up by New York State as early as 1829, the present, nationwide system of deposit insurance was established by *The Banking Act, 1933* (widely known as the **Glass–Steagall Act**). In reaction to three banking panics between 1930 and 1933, the Glass–Steagall Act set up the Federal Deposit Insurance Corporation (FDIC) to implement the federal insurance of deposits. Participation in the scheme was mandatory for all Federal Reserve member banks. Other banks could participate if approved by the FDIC. A very high percentage of banks currently participate in the scheme although there remain some small uninsured credit unions and a few uninsured banks.

The Glass–Steagall Act was also responsible for a third distinction through the restrictions it placed on the operations of insured banks. These included the strict separation between investment and commercial banks. Commercial banks are deposit-accepting institutions (depository institutions), which were, in effect, prohibited by the Glass–Steagall Act from originating, trading or holding securities other than those of the federal government or general obligations of state and local governments. Other securities business was restricted to investment banks, which are non-depository institutions. The Glass–Steagall Act was repealed in 1999.

A fourth distinction is that between independent banks and banking organizations or **bank holding companies** (BHCs) – companies that have controlling interests in one or more US banks. The ability to form a bank holding company has existed for more than a century but it became a popular form of organization only after World War II. Forming a bank holding company provided a way around some of the restrictions imposed on banks by legislation. This was particularly true of restrictions on the formation of bank branches

both within and between states since a bank holding company could form separate banking subsidiaries in other parts of its home state or in other states. Up until 1956, bank holding companies could also have controlling interests in companies engaged in activities other than banking. This led to fears that bank assets would be used to finance the losses of non-banking subsidiaries, increasing the riskiness of banks. Thus, the *Bank Holding Company Act, 1956* prevented multi-bank holding companies from engaging in non-banking activities that were not, in the judgement of the Federal Reserve, closely related to banking. Multi-bank holding companies were also limited to owning banking subsidiaries in their home states, unless other states expressly permitted their entry. Since no state permitted such entry prior to 1975, the 1956 act ruled out the possibility of multi-bank holding companies engaging in interstate banking. In 1970 the law was extended to cover the activities of one-bank holding companies. We discuss recent changes to the Bank Holding Company Act in Section 4.2.2.

Fifthly, there is the classification of depository institutions into commercial banks (consisting of banks owned by bank holding companies and independent banks), thrift institutions and credit unions. **Thrifts** are subdivided into **savings and loan associations (S&Ls)** and **savings banks**. Thrifts have longer-term assets and liabilities than commercial banks. Their assets principally consist of long-term bonds or house mortgages. Until the early 1980s, mortgage advances were required to be fixed-interest loans. Their liabilities are almost exclusively savings and time deposits.

S&Ls are primarily involved in real estate and housing finance. They can be traced back to the early 1830s when they began to be set up as credit cooperatives to provide housing finance and to act as a safe repository for small savers. They became the second largest type of financial institution in the USA, behind only commercial banks, but have declined both in number and asset size following the savings and loans crisis of the 1980s (discussed in Box 4.1). Most S&Ls were organized as mutual associations (owned by their members rather than by stock-holders). Indeed, in the majority of states they were required by law to be mutual associations. Their very rapid growth in the nineteenth and early twentieth centuries can be seen as a reflection of the fear of ‘moneyed interests’ mentioned above. The collapse of house prices in the Great Depression of the early 1930s led to the failure of nearly 2,000 S&Ls (out of a total of just under

13,000) and to two important pieces of legislation – the establishment of the Federal Home Loan Bank system (1932), which provided a central credit facility to lend to troubled institutions, and the introduction of deposit insurance with the establishment of the Federal Savings and Loan Insurance Corporation (FSLIC) in 1934. This was similar to that provided for commercial banks by the FDIC. Problems began to arise, however, in the late 1960s and 1970s.

Savings banks were first set up in the early nineteenth century as mutual philanthropic institutions aimed to encourage the poor to save. They grew rapidly throughout the century, although they remained heavily concentrated in the northeast and middle Atlantic regions of the country. They, too, engaged in mortgage lending while also holding large quantities of government and corporate bonds. Savings banks have always been safer than other depository institutions. During the Depression only eight of the 598 savings banks failed and they also performed much better than S&Ls during the 1980s crisis. This was partly because they responded more flexibly to the changing economic and financial circumstances than did S&Ls and, from the late 1960s on, began diversifying their assets away from mortgages towards securities. Recently, a number of surviving S&Ls have converted to savings banks to escape the S&L name. Regulatory changes since the Second World War have, however, eroded the boundaries between savings banks and other financial intermediaries. All savings banks are now federally insured and many of the larger banks have shed their mutual status, although a higher proportion of savings banks have remained mutuals than has been the case with S&Ls. By May 2001, under 40 per cent of thrifts remained mutual.

Credit unions deal primarily in small, fixed-term, personal loans. Their funds come entirely from persons (and individual deposits are very small). As Table 4.2 shows, at the end of 2003, credit union assets totalled

#### More from the web

If you want to be really up-to-date with the number of US banks, try the FDIC website: [www.fdic.gov](http://www.fdic.gov). On the home page, click on ‘go’ for quick links for bankers in the top right-hand corner of the screen. Then, under the heading ‘Industry Analysis’, click on ‘Institution Directory’. You will find some very recent statistics and many well explained and useful links to various parts of the site.



**Box 4.1 The Savings and Loans crisis of the 1980s and 1990s**

*The 1933 Banking Act* had introduced federal deposit insurance through the FDIC. This was extended to S&Ls by the setting up of the Federal Savings and Loan Insurance Corporation (FSLIC) in 1934. The schemes required the payment by members of flat-rate premiums unrelated to the riskiness of assets. The Act also prohibited interest payments to owners of FDIC-insured demand deposits and authorized the Federal Reserve System (the Fed) and the FDIC to set limits for rates paid on insured savings deposits of various maturities. This was implemented by the Fed under Regulation Q. Although these interest rate ceilings were not extended to thrifts until 1966, their imposition on banks allowed thrifts also to raise funds at low cost without fear of competition for deposits from the banks. S&Ls flourished during the 1950s and 1960s as housing became a national priority. Mortgage lending tripled in the 1950s and in the 1960s the assets of S&Ls again doubled.

However, commercial banks began to find their way around the limitations through the use of Certificates of Deposit, placing increased pressure on S&Ls. The Fed responded by using powers granted to them in 1966 to allow S&Ls to offer interest rates on deposits half-a-point higher than the limit on banks. But in the 1970s inflation rates became more volatile and the Fed met increased inflationary pressure by tight monetary policy which forced market interest rates well above Regulation Q ceilings. Money market mutual funds developed in the mid-1970s to offer savers higher rates of return, putting both banks and thrifts under severe competitive pressure for deposits.

In 1980, interest rate ceilings were removed, allowing banks and thrifts to compete for deposits, but the problem continued until 1982 when they were allowed to offer an unregulated deposit account directly competitive with the money market mutual funds. But the higher interest rates sharply increased costs and, since S&Ls were still largely invested in much lower yielding fixed rate mortgages, most thrifts lost money. Net worth declined to what would have been crisis levels in the absence of federal deposit insurance.

No action was taken since it was assumed that the problem would disappear when interest rates again fell. Indeed, S&Ls were encouraged to expand and their capital requirements were lowered from 5 to 3 per cent of assets. Informally, the standards were lowered even further by the introduction of less stringent accounting principles and a cut in the number of examiners of thrifts.

Variable rate mortgages were allowed in 1981 but there was considerable consumer resistance to them. Congress expanded the lending activities permitted to thrifts to allow them to diversify their portfolios but this only made things worse as S&Ls sought to return to profit by engaging in very risky activities, including the purchase of junk bonds (see Box 4.4), secure in the knowledge that they were covered by the FSLIC. The number of loan defaults began to rise and S&Ls to fail.

Problems during the period were intensified by poor management of S&Ls and by fraud which was uncovered in many of the loans when institutions were taken over by FSLIC. The resources of FSLIC came under great pressure as it sought to dispose of the assets and liabilities of failed S&Ls. The FSLIC became insolvent and in 1989 its duties were transferred to the new Savings Association Insurance Fund (SAIF) at the FDIC.

\$629.1bn compared with \$7,602.5bn for commercial banks and \$1,474.3bn for savings institutions (thrifts). That is, credit union assets were only 8.3 per cent of commercial bank assets. Not only is the credit union sector much smaller in total than those of commercial banks and saving institutions but also the average size of credit unions in terms of assets is small in comparison with both banks and savings institutions. The average size of the three types of depository institution at the end of 2003 was:

■ commercial banks	\$978.6m
■ savings institutions	\$1,043.4m
■ credit unions	\$64.8m

Table 4.1, which shows the distribution of consumer savings in the USA, shows a small gain in market share for credit unions in 2003. However, the gains are made at the expense of money market mutual funds and reflect a movement towards the holding of cash following the poor performance of stock markets in previous years.

Credit unions too were established as mutuals. Under the *Federal Credit Union Act*, their membership was limited to groups having a common bond of occupation or association. They were thus essentially local in nature. Although, unlike commercial banks and other thrifts, they were not legally prohibited from operating across state lines, the common bond

**Table 4.1** Distribution of Consumer Savings\* (\$ bn)

	31 December 2003		31 December 2002		Change 2002 to 2003%	
	Outstanding	Mkt share %	Outstanding	Mkt share %		
Commercial banks	3,307.5	56.7	3,061.1	54.6	246.4	8.1
Savings institutions	799.7	13.7	744.9	13.3	54.8	7.4
Money mkt mutual frnds	980.7	16.8	1,106.5	19.7	-125.8	-11.4
Credit unions	545.5	9.3	500.1	8.9	45.4	9.1
US savings securities	203.9	3.5	194.9	3.5	9.0	4.6
<b>Total</b>	<b>5,837.2</b>		<b>5,607.5</b>		<b>229.7</b>	

\*From Credit Union Call Reports and Fed Reserve H5 release.  
Source: Credit Union National Association (CUNA), Annual Report, 2003, p. 9.

requirement restricted the interstate activities of credit unions to a few large institutions serving the armed forces or large multinational corporations. However, in 1982, the regulator of federally chartered credit unions, the National Credit Union Administration (NCUA), ruled that in some cases a single credit union could serve more than one unrelated group, each of which shared a common bond. Much freer interpretations of the term 'common bond' have followed, resulting in credit union mergers. In 1991, the NCUA also allowed credit unions to share branches, giving them an inexpensive way of expanding geographically. Table 4.2 provides a comparison of the numbers of different types of federally insured depository institutions at the ends of 1984, 1994, 2000 and 2003.

Finally, there is the relationship between banks and the **Federal Reserve System** (widely known as the Fed). Under the *Federal Reserve Act, 1913*, all national banks were required to become members of the Federal Reserve but membership was optional for state-chartered banks. Membership gave access to Federal Reserve services but imposed obligations such as reserve requirements designed to guarantee the liquidity of banks. The *Depository Institutions and Monetary Control Act, 1980* extended the Fed's benefits and obligations to all depository institutions but state banks may still be classified as member or non-member banks of the Federal Reserve System. At the end of 2003, there were 2,001 nationally chartered commercial banks (25.8 per cent of the total) and 815 federally chartered savings institutions (57.6 per cent of the total). Only 16.2 per cent of state-chartered commercial banks are Fed members (935 out of 5,768).

#### 4.2.2 Changes in the structure of depository institutions

As Table 4.2 shows, in the 19 years between 1984 and 2003, the total number of FDIC-insured depository institutions fell by nearly 50 per cent to 9,182. The number of credit unions also declined by 36 per cent in this period.

Among banks, numbers of savings institutions declined most rapidly (by 59 per cent) between 1984 and 2003. This partly reflected the number of failed Savings and Loan Associations in the 1980s and 1990s (discussed in Box 4.1). However, commercial bank numbers also fell by 46 per cent. In addition, there was a considerable shift away from independent banks to **bank holding companies**. By the end of 2003, the 2,133 bank holding companies controlled 97 per cent of US commercial bank assets.

Amel (1996) identifies five reasons for the considerable structural changes within depository institutions:

- mergers and acquisitions;
- legislative changes affecting interstate expansion;
- legislative changes affecting expansion by branching;
- changes in credit union membership regulations;
- failures of depository institutions.

Merger activity among healthy banks rose to record levels during the 1980s as banks sought to reduce costs, partly as a result of increased competition from non-depository institutions. This was spurred by technological change which broadened access to the commercial paper market and reduced the role of

**Table 4.2** Changes in number of FDIC-insured banks 1984–2003

	Number				Assets (\$m)
	1984	1994	2000	2003	End 2003
Commercial Banks	14,381	10,359	8,315	7,769	7,602,489
Savings Institutions	3,414	2,058	1,590	1,413	1,474,288
Credit Unions	15,126	11,927	10,684	9,709	629,134
Total	32,921	24,344	20,589	18,891	9,705,911

Sources: Federal Deposit Insurance Corporation (FDIC), *Statistics on Banking*, Tables 101 and RC; Credit Union National Association (CUNA), *Annual Reports*.

commercial banks in lending to large corporations. Technological change also probably reduced costs for large firms relative to small firms. From an average of about 200 in the years between 1970 and 1980, the number of bank acquisitions jumped to a total of nearly 8,000 between 1980 and 1998. Whereas acquisitions in the 1970s were principally of small banks, banks merged or taken over in the 1980s included larger institutions. The mergers that took place between 1980 and 1998 involved \$2,400bn in acquired assets – equal to 55 per cent of all banking assets in existence in 1980. Some of the mergers that took place, particularly between 1995 and 1998, were among the largest in US banking history. Table 4.3 shows a breakdown of the number and size of mergers in sub-periods between 1980 and 1998 and compares the number of acquisitions with the number of bank failures in the same period. It can be seen from the table that the number of mergers reached a peak during the mid- to late 1980s, a period when industry profit rates and share prices were very low. Rhoades (2000, p. 31) suggests that this is a little surprising because mergers are thought to be more likely during periods of high

share prices and profits. However, as Table 4.3 shows, the mid- to late 1980s was also a period of many bank failures and there may have been good buying opportunities for banks that were performing relatively well. In terms of assets acquired, the peak period was in the second half of the 1990s.

The large decrease in the number of US banks led to a considerable increase in the nationwide concentration of bank deposits in the largest banks.

It is noteworthy that despite the reduction in the number of banks and the explosion in the number of ATMs during the same period, there were continuing increases in the number of banking offices and in the number of cheques cleared. The growth in the number of banking offices suggests that the restrictions on the development of branch networks had in the past limited the number of banking offices. It further suggests that local markets continue to be relevant geographic markets and that ATMs and other forms of retail electronic banking are not yet substitutes for banking offices although that may still happen in the future.

A major element in the increased number of acquisitions was the changed attitude of the US government

**Table 4.3** Bank mergers and failures in USA, 1980–98

Period	Number of mergers	Assets acquired (\$bn)	Large mergers <sup>1</sup>	Number of failures
1980–84	1,838	204.989	15	172
1985–89	2,515	415.914	56	858
1990–94	1,993	574.111	76	412
1995–98	1,639	1,249.507	101	15
Total	7,985	2,444.522	248	1,457

<sup>1</sup> Mergers involving more than \$1bn of assets are classified as large.  
Source: Rhoades (2000).

and of federal agencies towards mergers in the finance industry. Under US law, any bank wishing to acquire another bank must obtain approval from the appropriate federal bank regulator and from the Department of Justice, which is the primary authority for administering US competition laws. From 1980 onwards, the administration of President Reagan spoke out strongly in favour of bank mergers in general and found few that it believed should be challenged.

These changed attitudes were also reflected in legislation and in the interpretation of legislation. Many individual states liberalized their banking laws to allow greater geographic expansion within their borders and interstate banking began to get under way as an increasing number of states passed laws allowing entry by banks from some or all other states. The first step towards allowing out-of-state bank holding companies to own banks was taken by Maine in 1975, although this only applied to banks from other states which granted similar rights to Maine bank holding companies. By 1983, however, all of the New England states had enacted similar reciprocal laws and by the end of 1994 every state but Hawaii had introduced laws allowing some degree of interstate banking. On 29 September 1995, bank holding companies were given the right to purchase banks throughout the USA for the first time since the passage of the *Bank Holding Company Act, 1956*. The *Riegle–Neal Interstate Banking and Branching Efficiency Act, 1994*, which permitted the expansion also from 30 September 1997, allowed banks to branch across state lines. This overrode all remaining restrictions on bank holding company expansion, including the state laws in Hawaii.

Legal interpretations by federal agencies led to the reduction of restrictions on state-chartered banks. In many states, the laws restricting intra-state branching had not applied to thrift institutions. The Office of the Comptroller of the Currency (OCC) argued that national banks were in competition with state-chartered thrifts and thus ruled that national banks could branch to the same extent as thrifts. This would have put state-chartered banking organizations at a disadvantage relative to national banks, and states responded by relaxing their restrictions on intra-state branching by state-chartered banks.

The OCC also took advantage of a long-standing rule which allowed national banks to move their head offices up to 30 miles and retain the previous head offices as branches. In 1985, the OCC ruled that a national bank that had an office within 30 miles of a state line

could make that its head office and then branch into the adjacent state. The ruling had little effect until 1994 when it began to be used by bank holding companies for branching across state lines against state laws. A few bank holding companies merged banks in more than two states by repeatedly moving their head offices near a state border, then across the border, then across the new ‘home state’ to within 30 miles of another state border and so on. This practice encouraged some states to allow interstate branching by state banks before the 1997 date set by the Riegle–Neal Act so that state-chartered banks were not at a disadvantage to national banks that branched interstate. Both the OCC rulings mentioned here survived a number of court challenges.

Federal agency interpretation was also important in breaking down the separation of securities and banking business. The Banking Act of 1933 (Glass–Steagall) had allowed banks to carry out securities business through separate subsidiaries provided they were not engaged principally in such non-banking activities. From the early 1980s on, the Fed and the OCC began to interpret this provision more liberally, allowing banks to expand in a small way into new markets – first commercial paper, then mortgage-backed bonds, corporate debt and equities. In 1982, the OCC authorized several national banks to conduct discount brokerage businesses through subsidiaries and in 1983 the Fed permitted the then second largest US bank holding company to acquire the largest US discount brokerage company. In 1986, the Fed ruled that a bank holding company subsidiary, until then doing only a discount brokerage business, could provide customers with investment advice. The OCC then authorized brokerage subsidiaries of national banks to provide investment advice. After 1986, some bank holding companies were able to extend their underwriting activities considerably.

The final factor in the consolidation of US depository institutions was the large number of failures in depository institutions in the 1980s and early 1990s. Between 1984 and 1994, 1,276 banks, 1,129 thrifts (predominantly S&Ls) and 987 credit unions failed. The crisis had an impact on interstate expansion by thrift institutions as the federal regulators sought to sell the failing firms at least cost to the thrift deposit insurance fund. In 1986, the Federal Home Loan Bank Board proposed that buyers of failing thrift institutions be allowed to branch into any three states of their choice. In 1990, a federal appeals court upheld the

right of the organization set up specially to dispose of failing thrifts<sup>1</sup> to allow purchasing banks to convert failed thrifts into branches, even if this violated state branching laws. In May 1992, the Office of Thrift Supervision, the successor agency to the Federal Home Loan Bank Board, acted to allow nationwide branching by all thrift institutions.

In November 1999, the *Gramm–Leach–Bliley Financial Services Modernization Act* (GLBA) was passed. This repealed the Glass–Steagall Act of 1933 and greatly amended the Bank Holding Company Act of 1956. It allowed bank holding companies to become a new entity called a financial holding company, which may make minority or controlling investments in any company, including non-bank financial companies such as securities and insurance firms. Some restrictions still remain as banks may not ‘routinely manage or operate’ their portfolio companies. This gave bank holding companies a much freer hand in merchant banking and generated a number of cross-industry mergers.

By the end of 2003, 451 domestic and 12 foreign-owned bank holding companies had qualified as financial holding companies. These, in addition to their bank assets of \$7,316bn had assets associated with non-banking activities of over \$2,000bn divided as follows:

■ insurance	\$411.9bn
■ securities	\$636.9bn
■ thrift institutions	\$133.1bn
■ other non-bank institutions	\$876.5bn

The US banking system has changed rapidly in a short time.

### 4.3 The Federal Reserve System

The *Federal Reserve System* (the Fed) was created by the Federal Reserve Act, 1913. Unlike most central banks in Europe, the Fed had not evolved into a central bank from an ordinary bank of discount, deposit and note issue. The Fed was a compromise between two central banking traditions – that of the corporate central bank, chartered by the state but owned wholly or in great part by private investors, and that of having the government’s fiscal authority (the US Treasury) act also as the central bank. The first was tried with

the First Bank of the United States (1791–1811) and the Second Bank of the United States (1816–36) but both were strongly opposed on the grounds that a large and privileged corporation with a monopoly of the federal government’s banking business was incompatible with America’s democratic ideals. Neither charter was renewed. In 1840–41 and from 1846 to 1914, the federal government acted as its own banker, establishing a number of sub-treasuries in major cities. Treasury officials gradually realized that funds might be added to or withdrawn from the private sector on a discretionary basis to prevent financial panics and as an element of macroeconomic policy. However, this led to a widespread fear of political control of money and finance, particularly that the Treasury would have a long-run bias towards ‘easy money’ and inflation and that it would favour some financial, geographic and economic interests over others. A financial panic in 1907 led to the setting up of a commission of enquiry and its report led to the 1913 Federal Reserve Act.

This gave both bankers and the Treasury a voice in central bank policy formulation but aimed to prevent control of policy by either New York bankers or Washington politicians. The system consists of 12 regional *Federal Reserve Banks*, each having authority in a specific geographical area, and a coordinating Federal Reserve Board in Washington DC. The capital stock of each of the regional Reserve Banks was subscribed by the member banks in its district. Member banks received a fixed dividend on their capital contribution with any profits in excess of these dividends going to the Treasury. They also received the right to participate in electing six of the nine directors of their Federal Reserve Bank. The other three directors

#### More from the web

The websites of the 12 regional Federal Reserve Banks provide a great deal of information and interest. Go to [www.federalreserveonline.org](http://www.federalreserveonline.org) and you will find links to an explanation of the Federal Reserve System and links to all 12 regional reserve banks. If you would like to play some games, try Boston and then click on ‘On-line Learning’. Several other regional Reserve Bank sites have educational resources as does the Fed itself – click on ‘Economic Education’ on the right-hand side.

<sup>1</sup> The Resolution Trust Corporation (RTC).

of each Bank were appointed by the Federal Reserve Board in Washington. The regional Reserve Banks were given a monopoly (originally only partial) of the nation's note issue, became fiscal agents of the government, banks of rediscount and reserve for member banks, and lenders of last resort in their districts. Each Bank set its own discount rate and engaged in its own open market operations. It was hoped that this decentralized structure would ensure a sufficient supply of credit in each region.

Member banks held legally prescribed reserves as deposits in their Reserve Banks and in return were entitled to rediscount their eligible commercial paper at the Banks when in need of temporary liquidity. They were also able to use the Fed clearing facilities including electronic funds transfers and the currency and information services of the Banks. The original Federal Reserve Board comprised five members appointed to staggered 10-year terms by the US President, and the Secretary of the Treasury and the Comptroller of the Currency as *ex-officio* members. The Fed was intended to be independent of:

- (a) private financial business interests;
- (b) duly constituted government authorities (executive and legislature); and
- (c) partisan political interests.

The job of the Federal Reserve Board was to oversee and supervise the operations of the Reserve Banks, coordinate their activities, handle the system's relations with the federal government, bring about a uniform banking and monetary policy in the USA, and participate in the regulation and supervision of the banking system. It was given little authority to initiate policies. Its late appearance meant that the Fed had to share regulatory and supervisory duties with already established federal agencies and state banking authorities. Under the present division of responsibilities, the Fed oversees bank holding companies, foreign banks and state-chartered banks which belong to the Federal Reserve System. The FDIC monitors other state banks at the federal level and runs the fund guaranteeing depositors in the event of failure.

The Office of the Comptroller of the Currency (OCC) oversees nationally chartered banks while the Office of Thrift Supervision oversees S&L institutions. (See Box 4.2 for a summary of the supervisory authorities.)

The Fed's responsibility for all bank holding companies has meant that, as bank holding companies have

become more popular, it has come to be the primary federal overseer of banks, now holding about 90 per cent of the nation's deposits.

It is widely held that the Fed performed badly in the Depression. Friedman and Schwartz (1963), for example, blame it for not suspending convertibility until it was too late. Part of the blame was placed on the decentralized structure of the system since during the Depression serious disagreements had arisen over monetary policy both among the Federal Reserve Banks and between the Banks and the Board. The Federal Reserve Bank of New York and, somewhat later, the Board, favoured policies to stimulate the economy, but several other regional banks had sufficient power to resist such policies.

In the Glass–Steagall Act of 1933 but particularly in the Banking Act of 1935, Congress moved to centralize authority in the renamed *Board of Governors of the Federal Reserve System*, led by a Chairman with enhanced powers. All seven members of the new Board were directly appointed by the President with the advice and consent of the Senate. The Federal Open Market Committee (FOMC) was set up and the Board was given the authority to adjust reserve requirements of its member banks. The FOMC comprised the seven members of the Board of Governors, the president of the Federal Reserve Board of New York and four other Reserve Bank presidents, serving on a rotating basis. This gave the Board members a permanent majority on the Committee and ensured a unified monetary policy.

The form of the Federal Reserve System established by the 1935 Act remains in place today. As the Bank of England did until its reform in 1997, the US central bank carries out all possible functions of a central bank, being:

- the bank to the banking system;
- the bank to the US government;
- the body responsible for monetary policy;
- the operator of the payments system;
- a major part of the system of supervision and regulation of depository institutions.

It also has a responsibility for the protection of consumers' rights in dealing with banks and for promoting community development and reinvestment.

In the 1935 reforms, the regional Reserve Banks lost their power to determine interest rates but they continue to have many functions. The modern role of the 12 regional Reserve Banks is set out in Box 4.3.

**Box 4.2 US banks supervisory authorities****Board of Governors of the Federal Reserve System (FRB)**

The US central bank. It supervises those state-chartered banks that are members of the Federal Reserve System as well as bank holding companies and non-bank subsidiaries owned or controlled by bank holding companies. Non-bank subsidiaries of holding companies include institutions such as mortgage banking companies, finance companies, securities brokers and dealers, investment or merchant banks, and trust companies. The FRB also has overall responsibility for all foreign banks operating in the USA but directly regulates only the agencies and branches of those foreign banks with state licences. Finally, the FRB also licenses and supervises some special purpose institutions, known as Edge or Agreement corporations, which are generally authorized to finance international transactions.

**Federal Deposit Insurance Corporation (FDIC)**

An independent agency that supervises those state-chartered banks which are not members of the Federal Reserve System as well as insuring the deposits of banks and thrifts through two funds, the Bank Insurance Fund (BIF) and the Savings Association Insurance Fund (SAIF). The FDIC also regulates the small number of branches of foreign banks that are permitted to accept deposits.

**Office of the Comptroller of the Currency (OCC)**

An independent bureau of the Department of the Treasury, the OCC was established in 1863 to supervise all banks chartered by the Federal government. These banks all have the word 'national' in their names or carry the abbreviations 'NA' or 'NS&T'. The OCC also regulates the agencies and branches of foreign banks that have a federal licence (these cannot be identified as having a federal licence from their names).

**Office of Thrift Supervision (OTS)**

The primary regulator of all Savings and Loan Associations (S&Ls), whether federally chartered or state chartered. The OTS was established as a bureau of the Department of the Treasury on 9 August 1989.

**National Credit Union Administration (NCUA)**

Supervises all credit unions and insures credit union deposits.

**Federal Financial Institutions Examinations Council (FFIEC)**

Established on 10 March 1979, the FFIEC is a formal interagency body empowered to prescribe uniform principles, standards and report forms for the federal examination of financial institutions by the FRB, the FDIC, the NCUA, the OCC and the OTS and to make recommendations to promote uniformity in the supervision of financial institutions.

**Box 4.3 The Functions of the 12 district Federal Reserve Banks**

Although monetary policy has, since 1935, been centralized and rests with the Board of Governors of the Federal Reserve System, the 12 district Federal Reserve Banks continue to play a number of important roles.

- They provide 5 of the 12 members of the Federal Open Market Committee (FOMC) and have the specific task of helping the Committee stay in touch with the economic conditions in all parts of the country.
- They supervise banks and bank and financial holding companies, helping to maintain the stability of the financial system.
- They provide financial services to depository institutions.
- They market and redeem government securities and savings bonds and conduct nationwide auctions of Treasury securities as well as maintaining the Treasury's funds account.
- They provide payments services – the safe and efficient transfer of funds and securities throughout the financial system.
- They distribute coins and currency.
- They are heavily involved in research and have an educational role.
- The Federal Reserve Bank of New York carries out open market operations and intervenes in foreign exchange markets on behalf of the Board of Governors.

The Chairman of the Board of the Federal Reserve is now widely regarded as one of the most powerful economic policymakers in the world. Nonetheless, a potent distrust of the Fed remains in American society. This is strongly reflected in Greider (1987) who sees the Fed as a non-elected body with an anti-inflationary bias that restrains economic growth in order to preserve the value of financial assets, most of which are owned by wealthy people.

#### 4.4 Non-depository Institutions in the USA

Non-depository institutions in the USA consist of securities firms, insurance companies, mutual funds, pension funds and finance companies.

##### 4.4.1 Securities firms

Securities firms engage in a variety of activities, most of which can be classified as investment banking or brokerage. The securities industry is overseen by the Securities and Exchange Commission (SEC) which regulates the issue of securities, and the various securities exchanges. There is also self-regulation of the industry through the National Association of Securities Dealers (NASD) and the Federal Reserve Board has some regulatory influence through determining the credit limits or margin requirements in securities markets. There are around 5,000 securities firms in the USA. In recent years the large US securities firms have spread throughout the world. At the same time, although foreign banks have not made major inroads into US retail banking, foreign-owned institutions, notably the very large Japanese banks, have entered strongly into wholesale banking and the securities industry in the USA.

Securities firms come to the attention of the public principally when there is a major collapse or court case. For example, in the 1980s, the US securities industry was perhaps best known in relation to the issue of junk bonds. This is dealt with in Box 4.4. Other well-known cases include that of Kidder Peabody, where the head of bond trading was fired in 1994 for allegedly creating \$350m of fictitious profits. This led to the demise of the firm. In 1991, Salomon Brothers had to pay several hundred million dollars in fines and compensation after its head of bond trading was found to have faked customer bids in Treasury auctions. New management

had to write off an additional several hundred million dollars early in 1995 for past bookkeeping errors. The US problems of Daiwa are discussed in Section 20.8.

The false description of client firms by Merrill Lynch, which came to light in the spring of 2002 is dealt with in Case Study 1.

##### 4.4.2 Insurance Companies

There are over 2,000 life insurance companies and more than 3,000 general insurers in the USA. In the 1970s and 1980s, life insurance companies ran into the same disintermediation difficulties as the S&Ls. At the beginning of the 1970s the assets of life insurance companies were long-term fixed interest (usually acquired years before when interest rates were low). Liabilities were very largely whole life policies. As market interest rates rose in the 1970s and as money market mutual funds developed offering much higher returns than were available on life policies, the competitiveness of the life insurance industry was much reduced.

Life insurance policies in fact consist of two elements – the insurance element and one of saving and accumulation. Policyholders found that they could unbundle their policies by taking out short-term life policies and undertaking the accumulation element in other ways. Between 1970 and 1984, premiums on life policies fell from 3.12 per cent to 1.99 per cent of disposable income while whole of life policies declined from 82 per cent to 22 per cent of new policies written. Lapses and surrenders of both old and new policies doubled to 12 per cent of all policies in force in 1984. Attempts by US companies to follow the UK practice of acquiring claims to real streams of goods and services (such as the earnings of industrial and commercial enterprises or holdings of real estate and property) were restricted by state regulations covering the types of assets life offices could hold. Nonetheless, they diversified as much as possible, often into riskier products with higher rates of return including junk bonds and doubtful commercial real estate loans. The sharp downturn in the junk bond market in 1989 caused problems for a number of, mainly small, life insurance companies. Forty-three companies failed in 1989, another 30 in 1990 and more in 1991, including some rather larger companies. The industry self-regulation authority, the National Association of Insurance Commissioners (NAIC), promoted nationwide standards for capital adequacy and for state guarantee funds.



#### Box 4.4 The growth of junk bonds

Junk bonds are corporate debt instruments that the credit-rating agencies regard as 'below investment grade' because they judge that the issuing companies might not be able to meet interest or principal payments. In the late 1970s the market consisted largely of debt securities of companies that had been successful in the past but had run into difficulties ('fallen angels'). However, from 1984 onwards, Michael Milken, of the securities firm Drexel Burnham Lambert, transformed the market by selling high-yield bonds as a means of raising finance for corporate raiders and shell companies without earnings or assets to undertake leveraged buyouts. The bonds yielded an average of 350–450 basis points more than Treasury bonds of similar maturities, but with a very wide range. For instance, bonds issued by a steel company, LTV, which sought legal protection from its creditors in 1986, yielded around 35 per cent. Milken found a ready home for the bonds among insurance companies and thrift institutions which were seeking to diversify away from fixed-interest lending and were willing to take risks to maintain returns, pension plans, the mutual funds and even the public directly. In 1980 there had been 46 issues of junk bonds for a total of \$1.38bn. By 1986 this had grown to 210 issues for a total of \$29.83bn.

Drexel charged very high commissions to the issuing firms (up to three or four per cent of the principal) and paid very high bonuses to their traders. In 1987 Milken received \$550m for his services. However, in 1989 Drexel was heavily fined for mail and securities fraud and the following year Milken was heavily fined and later jailed for securities violations which included cheating some customers and helping others to break securities law. The value of most junk bonds declined sharply in late 1989 and S&Ls were required under the *Financial Institutions Reform, Recovery and Enforcement Act* of 1989 to sell their junk bond holdings. Drexel Burnham Lambert went bankrupt in February 1990.

Insurance companies also responded to the pressure on their profits in the 1970s and 1980s by seeking to market more flexible types of policies and to enter new product markets. Some companies began to offer certificates of deposit or cash management accounts in direct competition with commercial banks while others which have merged with brokerage firms have begun to offer a wide range of securities-related services. Insurance companies have also begun to offer mutual funds to investors. The Gramm–Leach–Bliley Act, 1999, which removed the long-lived restriction on mergers between commercial banks and securities and insurance firms, paved the way for cross-industry mergers, particularly involving bank holding and insurance companies.

#### 4.4.3 Mutual Funds

**Mutual funds** (open-end funds that are the equivalent of unit trusts in the UK) are investment companies that invest pools of money into a number of investment options. They have been in existence since the 1920s and are regulated by the Securities and Exchange Commission (SEC) under the *Investment Company Act, 1940*. The Act sets fiduciary standards as well as reporting and disclosure requirements. Funds usually specialize in particular types of investment, including growth stocks, income-producing stocks, small-firm stocks, short- or

long-term bonds, tax-exempt bonds, precious metals or international stocks. We have seen that the development of money market mutual funds (MMMFs) from 1975 onwards had a profound effect on banks, thrifts and insurance companies. They specialize in high-grade, short-term securities that offer market returns on cash equivalents, and permit cheque-writing privileges. Thus they were able to offer rates of return that reflected the higher rates of short-term interest produced in the late 1970s by world economic events and the Fed's response to them. Between the beginning of 1979 and the end of 1982, the assets of money market mutual funds jumped from \$12bn to \$230bn.

Mutual funds continued to grow rapidly after 1982. The share of household assets held in these funds roughly doubled between 1990 and 1999 (Engen *et al.*, 2000), and by the end of this period nearly 20 per cent of household assets were held in them. Half of all US households owned shares in a mutual fund. There was particularly rapid growth in equity mutual funds, with the assets mutual funds invest in equities having expanded nearly twentyfold in this period. About 60 per cent of this growth reflected the rise in equity prices in the stock market boom of the late 1990s, the other 40 per cent coming from net new cash flow into the funds. As we saw in Table 4.1, the poor performance of stock markets in 2001 and 2002 led to a loss of market share for the mutual funds. By the

end of 2003, the share of money market mutual funds in consumer savings had fallen back to 16.8%.

At the end of August 2000, the assets of mutual funds totalled \$7,500bn. Equity mutual funds had assets of \$4,500bn of this (more than 60 per cent of the total). Money market funds had assets of \$2,000bn. Bond and hybrid funds combined had assets of \$1,000bn. Overall mutual funds had more assets under management than commercial banks. Much of the growth in mutual funds was through pension plans and other investment accounts, especially Individual Retirement Accounts (IRAs), which benefited from changes in taxation rules.

In 1999, 81 per cent of mutual fund assets were held by households. They held over 90 per cent of the assets of the equity mutual funds since institutional investors are more likely to invest in money market funds than in the longer-term equity, bond and hybrid funds. At the time of the Asian financial crisis and the Russian debt default in 1998, there was a flight from equity funds to the lower-risk money market and short-term bond funds, but this was soon reversed and in the first eight months of 1999 the net flow into equity mutual funds was at a record level. This seemed to reflect in part a movement of households away from the direct ownership of equities to indirect ownership of them through the mutual funds.

#### 4.4.4 Other non-depository institutions

Other non-depository institutions include finance companies and pension funds. Finance companies specialize in the provision of short- and medium-term credit to firms and households. Some are subsidiaries of bank holding companies or insurance companies or themselves have subsidiaries which offer banking or commercial services. Funds are raised mainly through bank loans or the issue of commercial paper or bonds, although some states allow finance companies to seek customer deposits under particular circumstances. Finance companies are for the most part regulated by the states and regulations vary between states. There are generally, however, limits placed on the size and the maturity of loans finance companies can make and on the interest rates they can charge.

Pension funds have developed in much the same way as in the UK. The performance of their portfolios is very susceptible to market conditions. Criticisms of the operation of pension funds led to the *Employee*

*Retirement Income Security Act, 1974* (revised in 1989) which introduced rules regarding the length of membership of the fund needed before a pension would be paid and about transfers from one fund to another. It also stipulated that contributions should be invested in a prudent manner. Pension funds are also subject to state regulation.

## 4.5 Summary

The US financial system is highly individual, having developed to reflect two major concerns present since the early days of the country – the fear of moneyed interests and the fear of being controlled either by large institutions in the financial centre of New York or by political forces concentrated in Washington.

This led to a complicated dual system of regulation and to state and federal laws limiting the ability of banks to open branches and to engage in interstate banking. This ensured that there would be a large number of small banks and that, in turn, contributed to the tendency of the system to suffer from bank runs and multi-bank panics.

This led to legislation that aimed to restrict the activities of banks and to insure their deposits. The result was a large reduction in the number of bank failures from the 1940s to the 1970s. However, with changes in the international economic environment in the 1970s, problems arose and the 1980s saw a new burst of bank failures especially among Savings and Loan Associations. This, together with the effects of technological change and a number of legislative changes at both federal and state levels, has produced a major consolidation of the US banking system which seems bound to continue. In recent years, banks have become increasingly free to open branches and to engage in interstate banking. In addition, the barrier erected between commercial and investment banking in the 1930s has begun to be eroded.

The US central bank (the Federal Reserve System) is also quite different from other central banks and the form it has taken also owes much to long-lived attitudes and to historical developments. There have also been a number of important developments among non-depository financial institutions, not least with the establishment of Money Market Mutual Funds in the 1970s and the very rapid growth of equity mutual funds in the 1990s.

## Key concepts in this chapter

Bank runs  
 State-chartered banks  
 The Glass–Steagall Act  
 Savings and Loan Associations  
 Savings banks  
 Federal Reserve banks

Multi-bank panics  
 National banks  
 Bank holding companies  
 Thrifts  
 Federal Reserve System  
 Mutual Funds

## Questions and problems

- 1 Why are US financial markets so important to the rest of the world?
- 2 Consider the relationship between US bank legislation and the structure of the banking industry in the USA.
- 3 Discuss the advantages and disadvantages of a banking system with large numbers of small, independent banks.
- 4 Why was investment banking separated from commercial banking in the USA? Do the arguments which were used for doing this in the 1930s still apply today?
- 5 Are there advantages in having a regionally based central bank? Compare the structure of the Federal Reserve System with that of the Bundesbank.
- 6 What did S&Ls and insurance companies have in common in the 1970s? Why did that cause them problems?

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## Chapter 5

# The German financial system

### *What you will learn in this chapter:*

- The monetary and financial upheavals in Germany's past
- The role of these upheavals in creating a financial 'stability culture'
- The characteristics of 'universal banking'
- The dominant role played by banks in the German financial system
- The comparatively small use made of 'plc' status by German firms
- The small role played by securities and equities in particular in German savings

## 5.1 Introduction

Between 1960 and 2000, the German economy emerged as the strongest in Europe and its financial system acquired an outstanding reputation for stability. For example, in Chapter 21 we note that other countries tried, from time to time, to link their currencies to the Deutschmark in order to acquire some of the reputation that it enjoyed as a currency with a low risk of depreciation.

The strength of the Deutschmark was often said to be the result of certain institutional features of the German financial system, in particular the independence of its central bank, the *Bundesbank*. This is not the whole story, as we shall see in the next section. A more fundamental explanation takes us back to Germany's economic and financial history. More than any other European country in the twentieth century, Germany has suffered the effects of violent currency fluctuations.

The first and most spectacular of these had its origins in the financing of Germany's 1914–18 war efforts, when the *Reichsbank*, the central bank, had provided finance to the government by accepting large quantities of treasury bills. This is as close as it is possible to get to financing a budget deficit by 'printing money' in a modern financial system. The government issues its own treasury bills and the central bank credits the government account with corresponding deposits. As government deposits were spent, the broad money supply increased by a corresponding amount and, naturally enough, notes and coin increased in step as some of the deposits were converted to cash. An indication of the rate of expansion is given by the fact that notes and coin in circulation increased by 50–60 per cent per year, 1917–21. After 1920, punitive reparations payments imposed by the allies made matters worse. The payments had to be made in US dollars and the only means of paying for these dollars, given the state of the German economy, was to buy them with Marks created by selling treasury bills to the *Reichsbank*. While war finance was the cause of the emergency, the *Reichsbank* occasionally protested at the unorthodox methods of finance but once the cause of the deficits was seen to be 'unfair' reparations

imposed by the allies, the *Reichsbank* gave up and agreed that 'it would continue to take into its reserves all the treasury bills the government wished to issue' (Marsh, 1992, p. 99). Predictably, the Mark fell rapidly in value against other currencies and, in an attempt to end the process, in 1922 the allies forced the passage of a law making the *Reichsbank* independent of government. It made not the slightest difference and the episode is thus an interesting illustration of the limited power of independence. Independent central banks succeed in the pursuit of low inflation because the community wants them to succeed. Where there is a view that inflation has some merit (as a means of undermining unfair reparations) central bank independence can achieve very little. Consumer prices rose at an exponential rate. At the worst, in 1923, prices rose nearly two billion fold. When stabilization finally occurred in November 1923<sup>1</sup> the exchange rate was M4.2 trillion per US dollar.<sup>2</sup> At inflation rates of this magnitude, conventional payment systems, based on money, collapse and exchange takes the form of barter, with all the inefficiencies and disruption that follow. Savings in the form of financial wealth, especially where the assets are of fixed nominal value, are also destroyed.

The hyperinflation of 1922–23 is now more than 80 years away. But there was a more recent reminder of its effects, particularly upon savings, in the conversion of the Mark in another post-war setting, in 1948. The Reichsmark, as it had by then become, was virtually worthless and, under allied supervision, the *Bank Deutscher Länder*, forerunner of the *Bundesbank*, embarked on a process of converting Reichsmarks into Deutschmarks. Current payments, including wages and salaries, were converted at a one-for-one basis in June 1948. But savings were converted in October 1948 at the rate of DM6.50 to RM100. Once again, financial wealth was drastically reduced.

It is this experience that has made *all* German institutions and administrations strongly inflation averse (and also perhaps more risk averse) than those of other countries. These aversions predate the *Bundesbank's* success. They explain *why* the *Bundesbank* was established with such a high degree of independence and they explain why the *Bundesbank* has had a comparatively simple task in maintaining low rates of inflation: it has enjoyed widespread support throughout German

<sup>1</sup> By linking the note issue to the value of agricultural and industrial land, a commodity in (relatively) fixed supply. See Marsh (1992) Ch. 4 for details.

<sup>2</sup> 1 trillion = 1,000 billion.

society. The aversions and the low inflation record also explain some other characteristics of the German financial system which we shall touch on in this chapter, particularly the low levels of equity holdings in household portfolios and the correspondingly low levels of equity finance in German firms.

In the rest of this chapter we shall look at German banks and other deposit-taking institutions (in Section 5.2); at non-deposit-taking institutions (in Section 5.3) and at the use of bond and equity markets by institutions and households (in Section 5.4).

## 5.2 Banks and other deposit-taking institutions

The central bank in Germany is the *Bundesbank*. It was formally established in 1957 with a constitution that made the stability of the currency its principal objective. Its constitution also stresses its independence from government, though the *Bundesbank* is technically owned by the central government, which has the power to appoint the president and other members of the directorate. The *Bundesbank* is organized along federal lines. Each state (Land) has a central bank (effectively regional offices of the *Bundesbank*) and each of these has one representative on the governing body of the *Bundesbank*. So far as the mechanical aspects of central banking are concerned, commercial banks hold operational balances with the Land central bank, which maintains balances with the *Bundesbank* in Frankfurt. Intra-regional payments are thus reflected in banks' balances at the Land central bank while net transfers between banks in different regions will be reflected in changed Land central bank balances at the *Bundesbank*. The *Bundesbank* is not responsible for supervision of the banking system, this is the job of the Federal Banking Supervisory Office, although the data required for monitoring bank behaviour is collected and published monthly by the *Bundesbank* as part of a whole series of banking statistics (see Deutsche Bundesbank *Banken Statistik* (monthly)).

With the launch of stage three of economic and monetary union on 1 January 1999 responsibility for deciding and implementing the single monetary policy in the euro area was transferred to the Eurosystem – the ECB and the 11 (12 from 2001) central banks of the member states. Within this system, member central banks are required to implement the monetary

policy decided upon by the ECB but otherwise retain most of the functions that one would expect to see in a national central bank. For example, the *Bundesbank* continues to function as the issuer and monitoring authority for DM banknotes (at least until January 2002); with its regional counterparts (the Land central banks) it continues to act as the bankers' bank as described in the last paragraph; it is banker to the Federal Government; it is the guardian of Germany's monetary reserves, though it needs the approval of the ECB for foreign exchange operations above a certain level; and it is responsible for monitoring national and international payments mechanisms and stability of German financial markets. What it does not do is decide upon the euro-wide 'refinancing rate', the rate at which the ECB, via the national central banks, is prepared to make funds available to the banking system. So far as the German banking system is concerned, its liquidity remains guaranteed by the Land central banks and then the *Bundesbank*, but the (repo) rate at which liquidity is forthcoming is set by the ECB.

Partly because of the *Bundesbank*'s record in maintaining price stability between 1948 and 1999, it has had considerable influence on the evolution of the ECB and the Eurosystem. This extends to an apparent preoccupation with monetary growth rates, long after most other countries abandoned them. The ECB publishes what it calls a 'reference' growth rate for broad money and uses departures from this target as one indicator of what should happen to interest rates. But it should be clear that it is the short-term interest rate that is the operating instrument (just as it was under the *Bundesbank*) rather than the monetary base. It has inherited much of the *Bundesbank*'s pragmatism as well: the rate of monetary growth has rarely been below its reference rate but this has never stopped the ECB from cutting interest rates when other indicators required it. Clearly, monetary trends were only one input into the decision-making process.

Under the *Bundesbank*, inflation targets were set in the light of what seemed reasonable at the time. There was never any attempt to use monetary policy to combat what the *Bundesbank* called 'unavoidable inflation'. Above all the approach 'underline[d] the *Bundesbank*'s conviction that control of the money supply for the sake of combating inflation and ensuring steady economic growth can only be successful if the policies and behaviour of public authorities, enterprises and trade unions are guided by the same objectives'. Furthermore, banks were (and are under the ECB)

subject to mandatory reserve ratios but the system uses lagged reserve accounting – reserves today must match deposits of an earlier date – and so there was no attempt to control reserves directly. Like other central banks, it provided reserves on demand to ensure the stability of the financial system. Also, like other central banks, the *Bundesbank* varied short-term interest rates to influence the *demand* for loans and only through that the demand for reserves and monetary growth.<sup>3</sup>

Unlike the UK, USA and Japan, Germany has a tradition of **universal banking**. This means that any recognized bank is able to provide a full range of banking services and many other services that elsewhere would be called financial rather than banking services. Thus they can offer the usual range of retail banking services but also engage in wholesale and investment banking. They can even buy and sell securities on behalf of customers. In the UK and USA it often appears that a single bank offers this range of services but strictly speaking it does this only by creating separately capitalized subsidiaries with names similar to the parent. Switzerland also has a tradition of universal banking while Spain, France and the Netherlands lie somewhere between the universal and the segmented traditions.

That said, it does not follow that banks are *obliged* to offer a full range of services with equal emphasis. Box 5.1 lists the categories of banking institutions recognized by the Federal Banking Supervisory Office. Banking statistics are published by the *Bundesbank* using these categories and a summary of recent figures appears in Table 5.1.

Using the concept of universal banking it is possible to divide the list of institutions into two groups: universal banks and specialist credit institutions. Universal banks in turn comprise the commercial banks, the saving banks and the credit cooperatives, while the remaining banks comprise the specialist category. When we go into more detail in a moment we shall see that the reason for distinguishing between commercial banks, savings banks and credit cooperatives is not because their functions differ – their names may suggest this but since they all offer ‘universal’ services this cannot be the case – but because their ownership structure is very different. Commercial banks are

### Box 5.1 The classification of German banks

#### Universal banks

##### Commercial banks

- The ‘big four’ banks

- Regional and other commercial banks

- Branches of foreign banks

##### Land banks

##### Savings banks

##### Regional institutions of credit cooperatives

##### Credit cooperatives

#### Specialized credit institutions

##### Mortgage banks

##### Building and loan associations

##### Banks with special functions

private sector institutions, savings banks are public sector institutions while credit cooperatives are ‘mutuals’. We look first at the universal group and then at the specialized institutions.

**Commercial banks** are privately owned banks, ranging in size from the ‘big four’ (Dresdner, Commerz-, Deutscher and Bayerische Hypo- and Vereinsbank), through regional banks, to branches of foreign banks. The big four (the *Großbanken*) all date from the beginnings of the unified German state in the 1870s. As universal banks, they offer retail, wholesale and investment banking though, by comparison with other universal banks, their business is concentrated especially in investment banking, the financing of firms and foreign trade. Only in recent years have they made a major effort to compete for retail deposits. The *Großbanken* account for approximately 10 per cent of all banking business in Germany. Next come the universal banks known as *Kreditbanken*.

Smaller, but still significant among commercial banks, are some regionally based banking groups such as the Berliner Handels and Frankfurter Bank (the *Regionalbanken*). Their description as ‘regional’ banks is a reference to their geographical origin and the fact that their branches tend still to be concentrated in those regions. However, they have branches throughout Germany (and abroad) and they are publicly quoted,

<sup>3</sup> This passage is based on evidence given by representatives of the *Bundesbank* to the UK Treasury and Civil Service Select Committee in November 1980. The evidence is particularly revealing of just how limited the *Bundesbank* felt its power to be and how heavily it relied on pushing in the direction that public opinion in general wishes to go.

Table 5.1 Selected assets and liabilities of German banks, end 2003 (€bn)

	No.	Assets				Liabilities				Total assets/ liabilities		
		Cash and balances at central banks	Bills	Other securities	Advances	Other deposits	Sight deposits	Time deposits	Saving deposits		Capital	Other
Big banks	4	12.8	3.7	202.8	763.3	62.1	206.0	531.8	27.4	58.8	220.7	1,044.7
Universal banks	261	23.1	7.2	353.7	1,324.6	95.3	397.7	867.2	99.3	99.5	340.2	1,803.9
Regional and other commercial banks	173	9.7	3.5	138.8	485.2	34.1	172.0	274.6	72.4	37.5	114.8	671.3
Branches of foreign banks	84	0.7	0.0	12.1	71.8	4.0	19.7	60.9	0.0	3.2	4.1	87.9
Land banks	13	3.4	0.8	269.0	1,015.6	56.9	101.2	652.6	15.6	63.3	513.0	1,345.7
Savings banks	491	20.9	1.1	262.6	691.1	24.3	201.6	249.1	305.0	46.0	198.3	1,000.0
Regional institutions of credit coops	2	0.6	0.1	61.9	116.5	7.5	34.5	105.0	0.0	10.0	37.1	186.6
Credit coops	1,393	13.3	0.5	127.9	406.9	17.7	112.9	152.8	180.1	14.2	106.3	566.3
Mortgage banks	25	1.6	0.0	187.2	660.8	21.9	4.3	272.1	0.0	20.9	574.1 <sup>1</sup>	871.5
Building and loan associations	27	0.1	0.0	22.3	139.5	11.1	2.0	138.0	0.3	7.2	25.7	172.9
Banks with special functions	14	0.4	0.2	78.2	405.9	39.4	3.9	215.4	0.0	17.2	287.6 <sup>1</sup>	524.1

Note: <sup>1</sup> mainly bearer bonds.Source: Deutsche Bundesbank, *Bankenstatistik*, February 2004, tables 3, 12, 13.



limited companies in the same way as the big four. With effect from January 1999, this category contains data for what were previously reported separately as 'private banks'.

Much smaller in aggregate are the branches of foreign banks (*Zweigstellen ausländischer Banken*). The German financial system has always been fairly open to foreign participation and currently some 90 foreign banks have branches in Germany, mostly operating in Frankfurt.

The *Landesbanken* began life as regional girobanks, banks whose main function was to operate a payments system. While continuing with this function, often in association with other banks as we shall see, they now offer a full range of banking services including international banking. As Table 5.1 shows, they are large institutions, measured by total assets.

Much smaller, but also more numerous, are the savings banks, or *Sparkassen*. As separate firms they number around 500, with approximately 20,000 branches between them. Many date from the nineteenth century when they were founded by local and regional government authority. Their function was to provide finance for local and regional infrastructure and to make loans to disadvantaged groups in the community. This was done by attracting small, retail, deposits from households and firms. In return for their public-spirited lending policy, the solvency of savings banks is guaranteed by the owning public authority which imposes some restrictions on the riskier areas of banking business. Consequently, they are subject to lower capital adequacy requirements (see Section 2.3).

The emphasis upon attracting 'small' deposits from the widest range of clients meant that the savings banks were in the strongest position (within the early German banking system) to develop a cheque payment system. This they did after 1900 by associating themselves with a regional girobank which conducted the clearing operations. The latter developed into the *Landesbanken* (see above) while the savings banks have maintained their emphasis upon retail deposit-taking.

**Cooperative banks** (*Kreditgenossenschaften*) constitute the third category of universal banks and are, as their name implies, mutual organizations owned by their members. Their origin was often linked to particular trades and professions, deposits being taken from members of the profession and loans being made to enterprises in that field, the objective being

to further the interests of the profession. Such banks are quite common in continental Europe. The biggest and best known – with obvious origins – is France's *Crédit Agricole*. In Germany there are nearly 1,800 with some 16,000 branches. There are many similarities between the savings and cooperative bank sectors. The individual coops have, for example, remained committed largely to retail deposit business on the liability side while making loans to a regional cooperative bank on the asset side. As with the *Landesbanken*, it is these regional cooperatives (called *Genossenschaftliche Zentralbanken*) that are the genuinely universal banks.

We turn next to the **specialist credit institutions**. These, obviously, are classified by function; we shall find various patterns of ownership within each category.

Germany has both *mortgage banks* (*Hypothekenbanken*) and *building and loan associations* (*Bausparkassen*). Both accept deposits but also finance their lending by the sale of bonds known as *Pfandbriefen*. Legally, the *Hypothekenbanken* are usually private companies while the *Bausparkassen* are owned by public authorities or are mutuals. The function of both is to provide finance for construction though the mortgage banks have also taken up considerable holdings of general government debt. Rather like the UK building society sector, the *Bausparkassen* have benefited from the increasing aspiration of people to own their own homes and from tax incentives which encourage borrowing for home purchase.

The instalment credit banks are mostly subsidiaries of the biggest commercial banks. Their lending consists largely of overdrafts to customers who also hold deposits with the bank and have their main income credited to an account held at the bank.

The remaining specialized credit institutions are institutions established by the state for some specific purpose, often linked to post-war reconstruction problems. They include the Equalization of Burdens Bank (*Lastenausgleichsbank*) whose main function was to settle claims for damages and to help with restitution claims by refugees. The Reconstruction Loan Corporation (*Kreditanstalt für Wiederaufbau*) was founded in 1948 to administer public funds for reconstruction purposes and now handles much of Germany's aid to developing countries. There are also specialist institutions dealing with the requirements of forestry and agriculture. There is also a Post Office Savings Bank (*Deutsche Postbank*) which holds personal sector deposits and operates a payments mechanism.

### 5.3 Non-deposit institutions

When we compare the German financial system with that of the UK or the USA, the first striking feature is the *presence* of ‘universal’ banks which we discussed in the previous section. The second is the *absence* of pension funds. In both the USA and the UK, pension funds constitute a major division of the ‘institutional’ investors and the importance of their behaviour, in securities markets in particular, is considerable. In Germany, however, the major provider of pensions is the state which operates a *pay-as-you-go* (as opposed to a *funded*) system in which pensions are paid out of current taxation; no investment fund is created. Where companies operate a pension scheme, they retain contributions within the firm as working capital so that pension payments are a charge on the firms’ profits. For savers who wish to make further provision for old age, there are tax incentives to do so by subscribing to life insurance policies and, as we shall see, insurance

companies have grown rapidly in recent years. In common with other European countries, Germany now has a rising proportion of retired to working population which is beginning to cause problems for the state scheme. It seems likely, therefore, that the future will see increasing private sector provision of pensions but that in itself does not necessarily mean the growth of a ‘pension fund sector’. It may simply mean the further expansion of insurance companies.

The two major non-bank groups of financial institutions in Germany, therefore, are the insurance companies, which function as we described for insurance companies in Section 2.4, and the investment funds, which function broadly as open-end mutual funds. They occupy a similar position to unit trust companies in the UK, though the instruments held by savers are known as ‘certificates’ rather than ‘units’.

Box 5.2 given some impression of the comparative size of these institutions as well as the distribution of their asset holdings. It also shows the effect on their balance sheets of the fall in equity prices in 2001–02.

#### Box 5.2 Financial assets of German non-bank institutional investors

End-of-year figures (€bn)

Item	2000	2003	Item	2000	2003
<b>Insurance enterprises</b>			<b>Investment funds</b>		
With banks <sup>1</sup>	863.3	1,063.9	With banks <sup>1</sup>	38.0	42.4
In shares	304.7	361.7	In shares	373.2	227.7
In debt securities	366.3	432.9	In debt securities	308.5	401.9
Participating interests	78.3	134.9	In other forms <sup>3</sup>	13.5	16.7
In other forms <sup>2</sup>	104.1	106.6	Total	733.2	688.7
Total	1,716.7	2,100.0	<b>Percentages</b>		
<b>Percentages</b>			With banks <sup>1</sup>	5.2	6.2
With banks <sup>1</sup>	50.1	50.7	In shares	50.9	33.1
In shares	17.8	17.2	In debt securities	42.0	58.4
In debt securities	21.3	20.6	In other forms	1.9	2.3
Participating interests	4.5	6.4	Total	100.0	100.0
In other forms <sup>2</sup>	6.3	5.1			
Total	100.0	100.0			

<sup>1</sup> Primarily time deposits, including registered debt securities and claims on banks arising from borrowers’ notes.

<sup>2</sup> Mortgages, claims arising from borrowers’ notes and book-entry securities as well as participating interest in non-banks.

<sup>3</sup> Primarily loans against borrowers’ notes.

Source: Deutsche Bundesbank, *Kapitalmarkt Statistik*, various issues.

The difference in size is immediately apparent (the combined assets of UK insurance companies converted at the current exchange rate would amount to approximately €3,200bn). Looking at the distribution of asset holdings, it is apparent that investment funds hold much higher proportions of securities. That said, the proportions are more similar now than they have been in the past and this represents a shift by insurance enterprises away from assets held with banks (primarily time deposits) towards securities of all kinds, a shift that would certainly be necessary if pensions are to become more fully-funded in future. However, in both cases the equity holdings remain considerably smaller than they are for corresponding institutions (long-term insurance companies and unit trusts) in the UK.

#### 5.4 The use of bond and equity markets in Germany

Universal banks and the lack of a pension funds sector are just two of the distinctive features of the German financial system. Others, which we shall discuss in this section, are:

- the limited use of equity finance by firms;
- the small size of equity markets relative to GDP;
- the small number of publicly quoted firms;
- the portfolio preference amongst households for deposits and bonds over equity;
- the dominant role of bank intermediation in channelling funds from surplus to deficit units.

Table 5.2 shows both the stock and new issues of equities and bonds in 2003. The importance of bond finance is immediately apparent, mainly because banks and other financial institutions rely very heavily upon bond finance. Equity finance is more important to non-financial firms but it is important to get this into perspective. Table 17.1 shows the value of company shares listed on the London Stock Exchange to be more than twice the €851bn shown here and the number of firms listed on the London Stock Exchange to be more than three times the number listed on all German exchanges. In 2003, there were no new net issues of company shares. In fact a small number were bought back by German firms and replaced with other (mainly bond) finance.

**Table 5.2** German capital markets

Amounts outstanding, by issuer, end 2003 (€bn)		
Shares		
	Banks	81
	Insurance companies	80
	Other financial	8
	Industrial and commercial corporations	682
	<b>Total</b>	<b>851</b>
Bonds		
	Banks	1,604
	All corporations	55
	Public sector	947
	<b>Total</b>	<b>2,606</b>
New issues during 2003 (€bn)		
Shares	Total	-7
Bonds		
	Banks	41
	All corporations	18
	Public Sector	65
	<b>Total</b>	<b>124</b>

Source: Deutsche Bundesbank, *Kapitalmarkt Statistik*, May 2004, tables II.2, II.4a, IV.2, IV.3.

If companies do not issue large numbers of shares, then households cannot hold them as a large part of their financial wealth. In the next chapter (in Section 6.2) we compare the composition of household financial wealth, and its recent trend, across a range of European countries. Table 6.9 summarizes and shows German households almost bottom of the group with about 16 per cent of their financial wealth held directly in equities. They come almost top of the group for holding their wealth in currency and deposits (34 per cent). ‘Securities other than shares’ (i.e. bonds) account for about 10 per cent (the second highest) while investment funds and insurance companies account for a similar proportion. As we noted above, a very small fraction of financial wealth is held in pension funds. Section 6.2 shows that the share taken by bonds and money are declining while equity investment (direct and indirect) is growing, but the process in recent years has been slow, slower indeed than in the early 1990s.

**More from the web**

Data on the balance sheets of German financial institutions can be found in *Bankenstatistik*, a monthly statistical supplement published by the Bundesbank, while data on securities issues can be found in *Kapitalmarkt Statistik*.

Both can be found on the DB's website: [www.deutschebundesbank.de](http://www.deutschebundesbank.de)

From the homepage click on 'statistics', then 'publications', then 'statistical supplements'.

Another very useful website offering statistics and commentary on the German banking scene is that of the German Banking Organization. The address is: [www.germanbanks.org](http://www.germanbanks.org)

Some useful information is also available from the Frankfurt Stock Exchange. Its address is: [www.deutsche-boerse.com](http://www.deutsche-boerse.com) (The most useful link is probably 'private investors'.)

**More from the web**

Many countries are currently facing problems with their existing pension arrangements, as a result of demographic and other factors. Amongst the European countries, Germany faces particularly severe problems, partly because its traditional arrangements relied so heavily on 'pay-as-you-go' and also because they were generous in their replacement rate.

The Mannheim Research Institute for the Economics of Aging is a major research centre for the study of pension economics. Based at the University of Mannheim, it is funded by the German state, by the German insurance industry, the EU and other international bodies.

Its publications (and other information) can be accessed at: [www.mea.uni-mannheim.de](http://www.mea.uni-mannheim.de)

The picture therefore is a consistent one in which equity financing is still relatively small for firms of all kinds, and makes up a small part of household savings.

Plainly, these characteristics are interrelated: if firms have historically avoided equity finance it follows that households must hold alternative assets. Nonetheless, we take each in turn.

**More from the web**  
**The German bond markets**

Details of the structure of the market for federal government bonds and data on issues and turnover can be found on the Bundesbank's website. There is a particularly useful publication, *The Market for German Federal Securities* available as a .pdf file. Unfortunately, at the time of writing the most recent issue available is dated 2000, but a new issue is due. To access this and other statistics about the bond market go to [www.bundesbank.de](http://www.bundesbank.de) and from the home page click on 'federal securities'.

Similar information for the German equity market can be found at [www.deutsche-boerse.com](http://www.deutsche-boerse.com). From the home page, go to 'info center', then 'statistics' and choose 'factbook'.

As in other countries, there are two main forms of corporate ownership in Germany: public, limited liability joint stock companies (AGs)<sup>4</sup> (which separate ownership and control) and private limited companies (GmbHs).<sup>5</sup> The latter outnumber the former in Germany by nearly 100 to 1 (500,000 to 5,600). Indeed, through the 1960s and 1970s the number of AGs actually declined, though this was reversed in the 1980s.

Three reasons for the unpopularity of AG status for many years were the relatively high rates of corporation tax in Germany which gives a large subsidy to (tax-deductible) interest payments on bonds; the legal requirement of a two-tier management board structure which requires worker representation; and a long tradition of family ownership and control of firms in Germany, which can be preserved as a GmbH. The latter has developed in recent years into a fear of the short-termism and instability of corporate control alleged to be characteristics of Anglo-Saxon economies where AG (plc) status is the norm for large firms (see Section 2.2).

As we said in the opening to this chapter, part of the reason for household's aversion to equity investment lay with Germany's exceptionally turbulent financial history. This turbulence has led to a strong anti-inflation consensus since 1948 and with low inflation one of the main arguments for equities as a

<sup>4</sup> *Aktiengesellschaft*. Equivalent to plc in the UK or corporation in the USA.

<sup>5</sup> *Gesellschaft mit beschränkter Haftung*. (Private) limited company or 'Ltd' in UK terms.

form of saving disappears. Taxation has also worked against household equity investment for much of the period, subjecting shareholders to double taxation (taxation of the company's profits and then taxation of the dividends paid to shareholders) and high rates of capital gains tax.

In recent years, governments have tried to tip the balance further towards equity financing and shareholding. Tax reforms in 1977 abolished the double taxation of dividend income and introduced a capital gains tax exemption for gains on shares held for more than six months. More recently, in 1994, the Companies Act was amended to simplify the formation of an AG and also removed employees' rights of co-determination, for AGs with fewer than 500 employees. When Deutsche Telekom was privatized in November 1996 the flotation was designed, like UK privatizations in the 1980s, with features to appeal to personal shareholders. It remains to be seen whether this, and other planned privatizations, do much to fire an enthusiasm for equity investment. But it may be worth noting that the Federal Government disposed of holdings in several major undertakings during the 1960s and did so on terms designed to attract broad groups of shareholders. The initial sales of these *Volksaktien* were initially successful but within a few years most had found their way to institutional investors – a story rather similar to that of the UK in the 1990s.

The main reason for the increased interest in equities, however, especially on the demand side, lies in the recognition by government and, more reluctantly, the general public, that alternatives have to be found to the dominant position of PAYG pension arrangements.

In 2001, the German government introduced a major reform of the German pension system called the 'Riester reform' (after the German Minister of Labour, Walter Riester). This had as its main objectives:

- The stabilization of contribution rates which threatened to reach unsustainable levels as a result of demographic changes. More specifically, the aim was to keep contribution rates below a maximum of 22 per cent of earnings while keeping the level of pension as a fraction of income (the 'replacement rate' above 67 per cent). The corresponding figures at the end of 2001 were 19 per cent and 70 per cent. Without reform, the contribution rate was projected to rise to 40 per cent by 2035.
- Secure the long-term stability of the replacement rate. The proposals aimed for a slow reduction over

20 years to a minimum rate of 67 per cent compared with the 70 per cent of 2002. But new methods of calculation in the proposals mean that the actual replacement rate will come down to 64 per cent.

- Increase the take-up of private, funded, supplementary pensions by offering various types of tax subsidy. The decision remains at the discretion of individual savers.

The crucial question obviously is whether the package will succeed in stabilizing the replacement rate at reasonable cost. This depends crucially on whether people can be induced to participate (voluntarily) in a supplementary private pension scheme. The subsidies are quite large – up to 40–50 per cent of their contribution for some groups. But the initial take-up was slow. By early 2003 it had reached 35 per cent of all eligible workers. Many polls, however, suggested that a majority of workers would have favoured a compulsory scheme and so it remains to be seen whether the take-up will continue to increase.

More serious for the success of the scheme is the suggestion that demographic trends will not allow a replacement rate of 67 per cent with a maximum contribution of 22 per cent of earnings. Research at the University of Mannheim (Börsch-Supan and Wilke, 2003) suggests that if this cap on contributions is maintained then replacement rate will fall quickly below 67 per cent and eventually stabilize at around 62 per cent. Those worst affected will be older current workers (born before 1970) who will not have time to build up sufficient savings to maintain income above this 62 per cent level.

The result of growing doubts about the adequacy of these reforms has led to a further proposal, the 'Rürup proposals', published in August 2003, at the centre of which is a proposal to raise the retirement age from 65 to 67 years, beginning in 2011 and proceeding in monthly increments until 2035. Initial reactions were very hostile and it remains to be seen whether these proposals make it into law without major modification.

## 5.5 Summary

The German financial system is one which, historically speaking, has been dominated by banks. Consequently, financial flows have been channelled through credit

institutions rather than through markets. The result is that firms' balance sheets show high levels of bank finance, followed by bond finance, with equity finance in a minority role. This has further consequences: Germany has relatively few public limited companies, and security markets, although large by comparison with some countries, are small relative to the German economy as a whole. Inevitably, therefore, households' asset portfolios are dominated by bank instruments, with equities, held directly or indirectly, playing a very small part.

The reasons for this are partly historical, resulting from Germany's turbulent financial history which has

created strong inflation aversion, making fixed interest and fixed nominal value assets relatively attractive. Pension funds, major participants in securities markets elsewhere, are largely absent in Germany because existing pension arrangements make them unnecessary. Additionally, there is a corporate culture which has favoured private ownership and the private conduct of business generally. Until recently, public limited liability status was also discouraged by tax and other regulatory measures. These have diminished in recent years and it may be that the immediate future will see an increase in market mediation, particularly if there is a change towards 'funded' pension arrangements.

### Key concepts in this chapter

Universal banking  
Commercial banks  
*Großbanken*  
Regional banks  
Private banks  
Cooperative banks

Specialist credit institutions  
Pay-as-you-go pension scheme  
Funded pension scheme  
AG  
GmbH

### Questions and problems

- Why has the *Bundesbank* placed such strong emphasis upon maintaining low rates of inflation? Comment on the significance of
  - 'independence' of the *Bundesbank*; and
  - popular support in helping to achieve that objective.
- Explain what is meant by 'universal banking'.
- Distinguish between 'commercial banks', 'savings banks' and 'cooperative banks'.
- Why does Germany have a very small pension fund sector?
- How would you explain the comparatively small role historically played by equities in the financing of German firms and in German household asset portfolios?

### Further reading

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[www.deutschebundesbank.de](http://www.deutschebundesbank.de)

[www.germanbanks.org](http://www.germanbanks.org)

[www.mea.uni-mannheim.de](http://www.mea.uni-mannheim.de)

## Chapter 6

# The French and Italian financial systems

### *What you will learn in this chapter:*

- The main features of the French and Italian banking systems
- The size and significance of non-depository institutions
- The comparatively small use made of equity finance by French and Italian firms in the past
- The role of social and political influences upon the past development of the systems



## 6.1 Introduction

For many years there has been a tradition of describing France as an ‘**overdraft economy**’. This term originated in the work of J R Hicks in 1974 and describes an economy in which the flow of funds between surplus and deficit units takes place largely through intermediaries, that is, banks rather than through markets. In simpler language, we might say that such economies rely on ‘indirect’ rather than ‘direct’ finance. It is essentially the same distinction that we first met in Chapter 2 where we distinguished between ‘bank-based’ and ‘market-based’ financial systems.

Until the 1970s it certainly was reasonable to describe France as a bank-based or overdraft economy, whether one focused on stocks or flows. However, since the 1970s there have been numerous changes (which we note below) which have moved the French financial system more towards the use of markets. In this respect, there are similarities between the French and the German systems (as we saw in the previous chapter). As in Germany, the French financial system is dominated by banks, and securities markets are (relative to the UK, USA and Japan) underdeveloped. Correspondingly, firm and household balance sheets are still dominated by bank instruments, but the picture is changing quickly.

Another characteristic of the French financial system is that historically it has always been highly centralized and regulated. Furthermore, the changes that have taken place in recent years have been much more closely connected to decisions by the French state to change the regulatory framework than is generally the case in other countries where they have been spontaneous responses on the part of the private sector to changed financial conditions.

Between 1945 and 1984 French banking regulation favoured the specialization of banking institutions. This contrasts with the German tradition of ‘universal’ banking which we looked at in the previous chapter. However, by the early 1980s three things were apparent. Firstly, the increasing trend toward a single European market was opening the French financial system to competition. Secondly, banks in other European countries, subject to lighter regulation, were better placed to exploit economies of scope. Thirdly, plans to encourage the development of French securities markets might cause a rapid switch of bank clients to deal directly in markets if the banking system remained

compartmentalized and required agents to deal with several banks at once. In fact, changes in regulations in 1985 and 1986, which allowed firms to issue money market instruments and thus to borrow directly from markets, reduced French banks’ intermediary role quite sharply. The ‘financial intermediation ratio’ which expresses bank lending to non-bank borrowers as a proportion of their total borrowing fell from 71 per cent in 1978 to 41 per cent in 2001.

The realization that the structure and regulation of French banking had to change led to the Banking Act of 1984, which was based upon the principles of universality (all credit institutions free to offer a full range of financial services) and thus also upon harmonization (all credit institutions subject to the same rules). Henceforth all credit institutions would come under the same regulators and supervisors. (The three most notable institutions not covered by the 1984 Act were the central bank – the *Banque de France* – the *Caisse des Dépôts et Consignations* and the financial arm of the Post Office.) That said, the Act recognized that credit institutions would continue to fall into several distinct groups. These categories are still widely used and are listed in Box 6.1, together with the number of such institutions at the end of 2002. (If we add the financial arm of the Post Office to the institutions listed in Box 6.1 then we have France’s monetary financial institutions or MFIs.) Until 1990 the total number of institutions remained steady at about 2,000. Since then the number has declined fairly steadily to about 1,000 by the beginning of 2003, largely through merger but also by the outright closure of smaller, often family-owned, institutions. Unlike in the UK, however, the reduction in the number of *firms* in France has not resulted in a significant reduction in the number of *branches*.

In 1996, the Financial Activity Modernization Act made an important change to the 1984 Act by extending the remit of the *Commission Bancaire* to investment firms (we return to this in a moment). More recently an Act of 1999 introduced a Deposit Guarantee Fund. These three pieces of legislation provide the framework for the operation of French banks and other credit institutions.

In the rest of this chapter we shall look firstly, in Section 6.2, at the structure and operation of the banking sector. We then turn, in Section 6.3, to specialist and non-deposit institutions. Then in Section 6.4 we look at financial markets and their importance.

In Sections 6.5 and 6.6 we move on to look at the Italian financial system, which definitely remains

**Box 6.1 French credit institutions**

	<i>No. at end December 2002</i>
Banks – members of the <i>Association des Banques Française</i> e.g. <i>BNP-Paribas, Société Générale</i>	418
Mutual or cooperative banks e.g. <i>Groupe Crédit Agricole, Crédit Mutuel</i>	102
Savings and provident institutions <i>Caisse d'épargne et de prévoyance des Alpes,</i> <i>Caisse d'épargne et de prévoyance d'Alsace,</i>	33
Municipal credit banks, <i>Caisse de crédit municipal d'Avignon,</i> <i>Caisse de crédit municipal de Bordeaux, etc . . .</i>	20
Financial companies e.g. <i>Abbey national France, Lille (Nord),</i> <i>Crédit immobilier de France-Manche</i> <i>Société financière de grands magasins, Paris</i>	490
Specialist financial companies e.g. <i>Crédit Foncier de Paris</i> (land bank) <i>Euronext, Paris</i> <i>Société de développement régional</i> (various)	16

Source: [www.banquedefrance.fr/gb/infobafi/main.htm](http://www.banquedefrance.fr/gb/infobafi/main.htm), 'Authorisations granted by the CECEI'.

**More from the web****The website of the *Banque de France***

The website of the *Banque de France* (the French central bank) can be accessed at: [www.banquedefrance.fr](http://www.banquedefrance.fr)

Amongst many resources, it offers:

*Banking and Financial Information*

An area explaining the structure and regulation of the French monetary and financial systems.

*Monthly Digest of the Banque de France*

A monthly update of monetary and financial developments in France. Its 'Editorial' and 'Economic and Monetary Highlight' provide information and commentary on recent developments. The 'Statistics' section contains the latest of a wide range of monetary and financial statistics.

*Statistics*

Long runs of monetary and financial statistics

bank-based. It contrasts, however, with the French system in that one part of the securities market has become highly developed – the market for public sector

debt. Corporate finance has come almost entirely from retained earnings and borrowing from banks. The one thing that all the financial systems we have looked at have in common is that they have been subject to great change in recent years. As usual, the final section, 6.7, summarizes.

**6.2 The French banking system**

As with other banking systems, it is reasonable to begin our review by starting with the most central organizations and then working down to local institutions. The *Banque de France* is France's central bank. Founded in 1800, the *Banque* was nationalized in 1945. It was made 'autonomous' from government by legislation in 1993 but it remains a limited company whose capital is 100 per cent owned by the state. It is headed by a governor and two deputies, appointed by the government for a term of six years, renewable once. The 1993 Act protects them from being dismissed except by reason of criminal acts. The main decision-making bodies within the *Banque* are the *Conseil de la Politique Monétaire* and the *Conseil Général*, the former having

responsibility for monetary policy and the latter looking after day-to-day administrative matters. The government also makes appointments to these bodies for fixed terms but with similar protection. As the central bank, the *Banque de France* manages the government accounts, the foreign exchange reserves and holds the operational deposits of commercial banks. Since the introduction of the single currency in 1999, the *Banque de France* has occupied the role of a national central bank within the European System of Central Banks (ESCB) headed by the European Central Bank (ECB). The ECB sets a single interest rate (strictly three rates) which applies across all members of the monetary union. The role of the NCBs is then:

- to collect information (including national monetary and financial statistics) according to a standard framework laid down by the ECB;
- to report to the ECB on economic and monetary conditions within the national state;
- to supply reserves and foreign currency to French banks at interest and exchange rates laid down by the ECB

In addition to these functions, the *Banque de France* also plays a significant role in the supervision of the French banking system.

Figure 6.1 shows the structure of the regulatory bodies created by the 1984 Act. Recall that we are dealing here with ‘credit institutions’. Unlike the UK, which

has opted for a single supervisory agency (the FSA), at least until recently France has preferred separate and specialized supervisors for banks, the insurance industry and financial markets. After 1984 the insurance industry was supervised by the *Commission de Contrôle des Assurances* (CCA) while the stock market was the responsibility of the *Commission des Opérations de Bourse* (COB). Until 2003, supervision of other markets was the responsibility of the *Conseil des Marchés Financiers* (CMF) while another range of provident institutions was supervised by the *Commission de contrôle des mutuelles et des institutions de prévoyance* (CCMIP). One potential problem of specialist supervisors arises from the need for coordination. The danger of incomplete supervision arising from this type of arrangement was recognized in 2003 when the COB and CMF were merged (and joined also with the *Conseil de discipline de la gestion financière* or CDGF) to form a single market regulator (the *Autorité des Marchés Financiers* or AMF). At the same time, the CCA and CCMIP merged to give a single authority for (non-credit) financial institutions, the *Commission de contrôle des assurances, des mutuelles et des institutions de prévoyances* (CCAMIP). Even so, in a system of universal banking, credit institutions will act as agents for clients in access to financial markets and may even engage in proprietary trading on their own behalf and, in these circumstances, banking and market supervisors must be willing to share information and to cooperate. Where credit institutions are

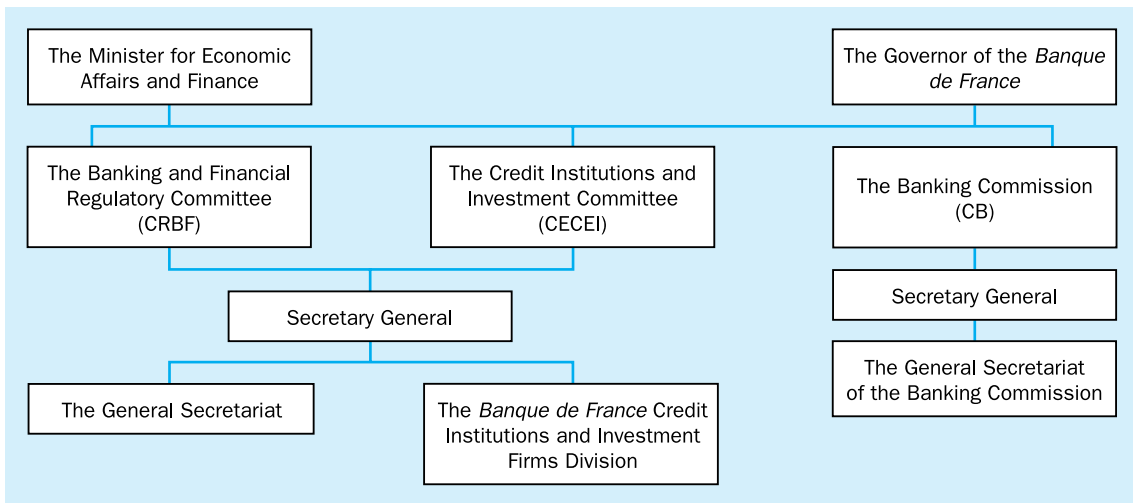


Figure 6.1

concerned, the key committees in the regulatory structure are shown in the second line of Figure 6.1 and amongst these it is the *Commission Bancaire* (CB) which provides the link from banking supervision to the supervision of markets carried out by the AMF and other financial institutions by the CCAMIP.

The regulation of financial activity in France rests ultimately with the Minister for Economic Affairs and Finance. Where the activity refers to credit institutions, the Minister appoints the Governor of the Banque de France, subject to the approval of the French Council of Ministers. The Minister appoints the members of all three committees in the second line of Figure 6.1 and chairs the *Comité de la Réglementation Bancaire et Financière* (CRBF). Furthermore, he is represented on the other two, the *Comité des Etablissements de Crédit et des Entreprises d'Investissement* (CECEI) and the *Commission Bancaire* (CB) which are chaired by the Governor. Essentially the CRBF lays down the regulations governing the behaviour of credit institutions (checking for consistency with the AMF where credit institutions are engaged in investment activity). The CECEI issues authorizations and licences to operate as a credit institution in France and the CB:

- supervises the financial position of credit institutions;
- ensures that they adhere to the rules laid down by the CRBF; and
- imposes sanctions for breaches of these regulations.

#### More from the web The *Commission Bancaire*

The CB is the main body responsible for the day-to-day supervision of credit institutions in France. Since most credit institutions also carry out securities dealing and have contacts with financial markets and insurance, the CB works closely with other regulatory bodies like the CCA and AMF. Details of the CB's responsibilities, powers and activities are contained in Fact Sheet no. 120 'The Commission Bancaire' available from [www.banquedefrance.fr](http://www.banquedefrance.fr). Click on 'welcome' and then enter 'Fact Sheet no. 120' in the search box. An explanation of the CB's role and its relation to the CECEI and CRBF can be found at [www.banquedefrance.fr/gb/banque/main.htm](http://www.banquedefrance.fr/gb/banque/main.htm). Click on 'The Banque de France and the ESCB' and then on 'Regulating and supervising the banking system and investment firms'.

The major banks in France are members of the *Association Française des Banques*. (For purposes of statistical reporting their aggregated data often appears under the heading 'AFB banks'.) This group includes famous names like *Société Générale*. It also includes *BNP-Paribas*, formed in 1999 by a merger between *Banque National de Paris* and *Paribas*. Since 1945 all the major French banks have experienced periods of state ownership. A wave of nationalization was justified in 1982, by a socialist government, on the grounds that small and medium-sized firms were at a persistent disadvantage and that the banks were reluctant to finance sections of industry which the government saw as being of strategic importance. The results were disappointing and since 1986 the movement towards private ownership has been justified by the need for banks to be able to raise more capital and have more freedom to compete in the emerging single market. Even so, the state has retained large stakes – directly or indirectly – in the privatized banks. Freedom of behaviour does not necessarily follow ownership, however. The *Banque de France* and the Ministry of Finance have always exercised considerable influence over the French banking system by the use of 'moral suasion'. Since the 1984 Act, AFB members have functioned more or less as universal banks, offering retail, investment and wholesale banking services and a money transmission mechanism. The AFB has about 400 members, a figure which has been fairly stable since the 1950s. In recent years they have been under great pressure from the mutual and cooperative banks and the savings banks (see below) for deposits.

**Mutual and cooperative banks** have broadly similar origins, structures and functions. They are owned by their 'members', usually their depositors. Their origins lie in the nineteenth century when their purpose was to provide a source of credit for people with limited income. Because they did not need to earn a profit for shareholders, their lending rates would be comparatively low. The rates paid to members were also comparatively low but were none the less attractive to members, who were mainly small depositors and not welcome at the larger private banks. So far as structure is concerned, we can take the *Crédit Mutuel* as typical of the group of mutual banks. At the base of the pyramid, there are local offices grouped into several cooperative companies. Each of the local offices is a member of a regional federation (22 in all). The function of the regional offices is to provide clearing facilities between local offices, to pool and on-lend their

surpluses and to make loans to local offices where necessary (creating in effect an interbank market for mutuals). There are two national organizations: the *Caisse Centrale de Crédit Mutuel* and the *Cofédération Nationale de Crédit Mutuel*. The former acts as a bank to the regional organizations while the latter is a more ‘political’ body, speaking on behalf of the movement and representing their common interests.

The other cooperative and mutual banks are organized upon similar pyramid lines – local branches, regional offices and a national organization. Their objectives are also similar, taking deposits from and lending to members who tend to be households or local public bodies or cooperative and mutual organizations. As the names of the organizations suggest, their members tend to be drawn from a particular field of activity – fishing, agriculture and so on. The *Crédit Agricole* has been particularly successful in competing for deposits with the large AFB banks and absorbed *Crédit Lyonnais* in 2003.

The *Caisses d’Epargne*, savings banks, are also cooperative institutions providing a full range of services for retail depositors, with the distinctive features, however, that loans must not be for commercial and trade purposes and interest on deposits is tax-free up to a maximum threshold. Like the other financial networks, the savings banks have a regional layer of organization (the SOREFIs) and two national bodies. The *Centre National des Caisses d’Epargne et de Prévoyance* represents the interests of the movement and provides regulatory oversight while the *Caisse des Dépôts et Consignations* (CDC) manages the funds collected by the savings bank network.

The CDC is another institution whose activities fall outside the 1984 Banking Law provisions. It occupies a central role in the French financial system and participates extensively in the long-term securities markets. Although it takes deposits (indirectly via the *Caisses d’Epargne*) its activities are so extensive that we discuss it in more detail in the next section.

Municipal credit banks, collectively known as the *Crédit Municipal*, are established by local authorities. They accept deposits from the general public, again with an emphasis upon personal savings, and make loans to public sector employees and organizations. They also provide a home for the local authority’s spare funds. Since each is created by its own local authority, each *Crédit Municipal* is independent of the others, but there is a national organization, the *Central Union des Crédit Municipaux*, which represents their common interests.

In fact, the French banking system is now quite highly concentrated. Although Box 6.1 shows that there were 418 banks in 2002, France’s banking system is now dominated by the ‘top-7’ which account for about 80 per cent of retail deposits. This concentration has come about largely through mergers, most of which have involved domestic banks. The takeover of CCF by HSBC in 2000 is a notable exception.

Finally, before leaving this list of deposit-taking, ‘banking’ institutions, we should note that the French postal service also offers money transmission services, clearing cheques drawn on generally small, retail deposits. It is not allowed to make loans. It also collects savings for the National Savings Fund, one of many funds managed by the CDC.

We noted in the introduction to this chapter that the French financial system has traditionally been highly centralized and highly regulated. Both of these characteristics, as applied to the banking system, require further comment. With the development of a single market there is an inevitable tendency towards homogenization of systems, products and procedures. It is thus a common theme in the recent development of most European financial systems that rapid change has been necessary to meet the threat of competition posed by more lightly regulated institutions with a background in the UK (or even in the USA). France, Italy and Germany have all had to give more freedom to their banking systems in recent years. In France, for example, lending rates were controlled by the *Banque de France* until 1967. The legislation which liberalized lending rates also lifted restrictions on the opening of

**Box 6.2 The ‘top 7’ banking groups  
(assets in €bn)**

<i>Groupe Crédit Agricole</i>	785*
<i>BNP-Paribas</i>	783*
<i>Société Générale</i>	501**
<i>Caisses d’Epargne</i>	357**
<i>Crédit Mutuel-CIC</i>	354*
<i>Banques Populaire de France</i>	237*
<i>Crédit Commercial de France – HSBC</i>	71*

\*end-2003; \*\*end-2002

Source: Annual reports on respective websites.

**More from the web**  
**Credit Institutions licensed by the CECEI**

A full list of individual institutions approved by the CECEI can be found on the website of the *Banque de France*. These are listed by the categories shown in Box 6.1, but subdivided into several levels of subcategory.

A glance at the list, especially the sections dealing with mutual/cooperative banks and municipal credit banks helps to illustrate the ‘pyramiding’ structure of these institutions as discussed above. The list can be found at: [www.banquedefrance.fr](http://www.banquedefrance.fr)

Click on ‘Banking and Financial information’ and then on ‘Authorisations granted by the *Comité des établissements de crédit et des entreprises d’investissement* (CECEI) to credit institutions and investment firms’.

bank branches with the result that many large banks opened new branches, one form of non-price competition, to the point where some areas of France became ‘over banked’. Since 1986, banks have been closing branches in an attempt to cut costs and restore profits.

The deregulation of deposit rates has, however, been more gradual. The 1967 act actually prohibited interest payments on sight deposits, a state of affairs which was defended by banks for many years on the grounds that it enabled them to provide ‘free’ services on current accounts. The continuing controls on deposit rates was a major reason for the outbreak of *non-price* competition in the 1970s. Such restrictions create fertile ground for financial innovation to sidestep the controls. (See, for example, the development of US money market mutual funds in Chapter 4.) By 1996 deposit rates and bank commissions, and fees generally, were deregulated. This was partly a response to circumventory innovations but also to the development of a single market, in which banks from most other countries paid market-determined rates on all deposits, and also to a desire to see greater clarity in the pricing of banking services, with explicit prices for each service and less cross-subsidization.

The advent of the euro has brought the development of a single European market in financial services one step nearer and it was always doubtful whether, in these circumstances, French banks could continue to resist payment of interest on current accounts, when the practice was virtually universal elsewhere. The restriction was lifted in 2001.

One consequence of lifting this restriction is that it has intensified further the competition already encouraged by recent deregulation and which has seen the number of French banks and other financial institutions almost halving since 1990. This is just one example of the general trends that we discussed in Section 2.3 being played out in a particular system. Another is the advance of technology which has affected payment and money transmission practices much as it has in the UK. In 2000, the Dutch financial services group ING began offering internet banking facilities to French clients, offering attractive deposit rates (on *all* positive balances) and generally low charges. This was a timely demonstration of just how competitive the removal of national barriers combined with new technology would make the European financial marketplace in future. Most major French banks have now followed suit.

The aggregate balance sheet of French MFIs (excluding the *Banque de France*) is shown in Table 6.1. The bulk of liabilities shown in Table 6.1 are the liquid assets of French residents. Table 6.2 shows French resident holdings of liquid assets.

In recent years, French banks have been subject to many of the same pressures and trends that we have already seen working on UK banks (Chapter 3). There has been a shedding of staff and a consequent increase in productivity. The effect can be seen in the last few years where income growth has been almost static but costs as a fraction of income have fallen from 74 per cent to 64 per cent in the 10 years since 1994. There has been the same trend towards diversification of activities and a greater concentration on services and financial products. The consequence has been a steady rise in non-interest income as a fraction of total income from 20 per cent in 1995 to 30 per cent in 2000 and almost 35 per cent in 2004.<sup>1</sup>

<sup>1</sup> These and other figures in this section are drawn from ‘Developments in France’s Banking System since the 1960s’, available at [www.banquedefrance.fr](http://www.banquedefrance.fr)

**Table 6.1** Balance Sheet of French MFIs, end 2003 (€bn)

ASSETS		LIABILITIES	
National territory		National territory	
Current account with the <i>Banque de France</i>		MFIs	933.7
Loans	2,273.2	General government	39.1
<i>MFIs</i>	931.2	Other sectors	1,073.3
General government	142.2	Sight deposits	342.1
Private sector	1,176.4	Time deposits ≤ 2 years	49.6
Securities (exc shares)	434.5	Time deposits > 2 years	299.5
<i>MFIs ≤ 2 years</i>	128.8	Deposits redeemable at notice ≤ 3 months	351.3
<i>MFIs &gt; 2 years</i>	50.2	Repurchase agreements	30.7
General government	162.3	Other euro area countries – deposits	201.6
Private sector	93.3	<i>MFIs</i>	173.4
Money market fund units	63.8	Other sectors	28.2
Shares and other equity	239.9	Rest of the world – deposits	432.8
Other euro area countries	465.7	Not broken down by area	1,661.5
Rest of the world	500.8	<i>Debt securities issued ≤ 2 years</i>	218.6
Not broken down by area	364.0	> 2 years	375.6
TOTAL	4,341.9	<i>Money market fund units</i>	327.8
		<i>Capital and reserves</i>	291.9
		Other liabilities	447.5
		TOTAL	4,341.9

Source: www.banquedefrance, *The Monthly Digest*, 122, February 2004, table 7.

**Table 6.2** French residents' holdings of liquid assets, end 2003 (€bn)

	Households	Non-financial corporations	General government*	Other**	Total
Sight deposits	201.9	118.6	39.2	19.2	378.9
Passbook savings***	351.3	–	–	–	–
Time deposits ≤ 2 years	20.5	23.4	0.4	5.3	49.6
> 2 years	278.8	9.7	0.1	10.9	299.5
TOTALS	852.5	151.7	39.7	35.4	728

Notes: \* excludes central government; \*\* largely financial firms and mutual funds; \*\*\* mainly with the *Crédit Mutuel*.  
Source: Adapted from www.banquedefrance.fr, *Monetary Statistics*, January 2004, tables 6–8.

### 6.3 Specialist and non-deposit institutions

In a recent piece of research undertaken for the OECD, Babeau and Sbrano (2002) point out that international comparisons of wealth are extremely difficult to make with any degree of precision. This is partly because individual national accounts are generally speaking

better developed in their recording of *flows* (GDP, saving, investment etc.) and are much less detailed when recording *stocks*. But it is also due to problems of converting between currencies – where the use of purchasing power parity gives different results from the use of the current exchange rate. Furthermore, their study has the disadvantage for our purposes that it stops with 2000 data.

Nonetheless, because it is the *only* systematic comparative study and because it tries to identify trends – which may be accurate even if absolute national values are subject to dispute, it is worth noting some of the differences that they reveal. First of all, if we look at how much financial wealth people have, we can see, in Table 6.3, that there is a large difference between the wealthiest households (Netherlands) and the poorest (Spain), though higher rates of growth in Spain mean the differential is narrowing.

**Table 6.3** Per capita financial wealth (in €, PPP conversion)

	1995	2000	Compound annual growth (% p.a.)
Netherlands	47,915	76,841	9.9
UK	47,364	66,434	7.0
France	30,649	47,372	9.1
Italy	29,794	47,062	9.6
Germany	33,072	44,331	6.0
Spain	16,017	28,989	12.6

Source: Babeau and Sbrano, *Household Wealth in the National Accounts of Europe, the United States and Japan* (OECD 2003), table 1.

When it comes to holding liquid assets, Table 6.2 gives us absolute figures for different sectors of the French economy. Table 6.4 puts those figures into an international comparison and shows that bank products, currency and deposits, have been declining in importance in total wealth in all countries in the sample, but most rapidly in Italy and slowly in the UK.

**Table 6.4** The decline in banking intermediation (as % of financial wealth)

	1995	2000	change
Spain	51.8	36.2	–15.6
Germany	41.9	33.9	–8.0
France	39.1	30.4	–8.7
Italy	40.1	24.0	–16.0
UK	24.2	22.2	–2.0
Netherlands	22.5	18.1	–4.4

Source: Babeau and Sbrano, *Household Wealth in the National Accounts of Europe, the United States and Japan* (OECD 2003), table 6.

What these figures do not show explicitly, but can be established by more detailed investigation, is that it is time and savings deposits (rather than sight deposits) whose role has diminished, as alternative savings products have developed. In proportions and in scale of change, France features in mid-table.

There has also been a sharp decline in the portion of interest-bearing securities such as bonds and loans (Table 6.5). This is partly the result of efforts to redress the public finances in anticipation of the single currency regime. The trend is particularly notable in Italy, where such investments still accounted for nearly one-third of total household financial wealth at the beginning of the period. Also notable is the very large difference in the importance of these instruments in different countries. In the UK, bonds constitute barely 1 per cent of financial wealth, while in Italy it was over 18 per cent in 2000, in spite of a very sharp decline from 1995. In the share of wealth taken by loans and bonds, and in the scale of recent changes, France features in the middle of the sample.

**Table 6.5** The decline in loans and bonds (as % of financial wealth)

	1995	2000	change
Italy	30.7	18.7	–12.0
Germany	13.5	10.1	–3.4
France	5.5	2.7	–2.8
Netherlands	3.3	2.3	–1.1
Spain	4.2	1.9	–2.2
UK	1.6	1.3	–0.3

Source: Babeau and Sbrano, *Household Wealth in the National Accounts of Europe, the United States and Japan* (OECD 2003), table 7.

Since we are talking about proportions, the declining importance of bank and fixed interest assets must be matched by an increase in the holdings of other assets. Table 6.6 shows that direct shareholding has increased in importance. Although the growth of direct shareholding was quite marked in France in the years leading up to the millennium (up from 15.8 per cent of total financial wealth to about a quarter) the share and the change still place it in mid-table.

When we turn to indirect methods of equity investment, the picture is slightly different. France again features mid-table when it comes to the importance of equity-based mutual funds, but the rate of increase has been very slow in recent years.



**Table 6.6** Direct shareholding (as % of financial wealth)

	1995	2000	change
Spain	19.0	33.7	14.7
Italy	14.5	27.6	13.1
France	15.8	24.8	9.0
UK	15.7	17.4	1.7
Netherlands	15.4	16.8	1.5
Germany	10.9	15.6	4.7

Source: Babeau and Sbrano, *Household Wealth in the National Accounts of Europe, the United States and Japan* (OECD 2003), table 8.

**Table 6.8** Pension funds (as % of financial wealth)

	1995	2000	change
Netherlands	35.5	37.7	2.19
UK	22.3	22.1	-0.14
Germany	5.6	5.2	-0.43
Spain	4.5	5.3	0.77
France	1.8	1.5	-0.28
Italy	0.8	1.2	0.41

Source: Babeau and Sbrano, *Household Wealth in the National Accounts of Europe, the United States and Japan* (OECD 2003), table 13.

**Table 6.7** Mutual funds (exc money market funds) (as % of financial wealth)

	1995	2000	change
Italy	3.1	15.9	12.80
Germany	5.9	10.5	4.59
Spain	6.2	9.9	3.68
France	8.6	9.0	0.45
UK	3.8	5.8	2.06
Netherlands	3.6	5.5	1.95

Source: Babeau and Sbrano, *Household Wealth in the National Accounts of Europe, the United States and Japan* (OECD 2003), table 9.

The really big differences across the sample, however, occur with pension funds. As Table 6.8 shows, the sample splits in two, with households in the Netherlands and the UK holding very large parts of their

financial wealth in the form of funded pensions while households in Germany, France, Italy and Spain hold very little. Furthermore, the figures for recent changes suggest little evidence for a closing of the gap. Changes were very slow between 1995 and 2000, and in France the importance of pension fund wealth actually declined slightly. These figures show quite dramatically the difference in the extent to which some countries rely upon funded pension arrangements while others rely on 'pay-as-you-go'. Table 6.9 is interesting in that it brings together the figures for the shares of financial wealth accounted for by different assets across a range of countries, including the USA.

As Babeau and Sbrano warn at the outset, there are numerous problems involved in making these comparisons and the results should be treated with some caution. (The trends identified in the earlier tables are probably more robust.) On the basis of the figures,

**Table 6.9** Composition of financial assets in six European countries at the end of 2000 (% of total financial wealth)

	Italy	France	Germany	Netherlands	Spain	UK	USA
Currency and deposits	24.0	30.4	33.9	18.1	36.2	22.2	11.1
Money market funds	0.8	1.4	0.8	0.4	2.5	0.0	3.1
Securities other than shares	18.7	2.7	10.1	2.3	1.9	1.3	6.4
Listed shares	8.9	5.0	5.9	11.5	11.0	8.9	33.1
Non-listed shares	18.7	9.8	9.7	5.3	22.7	8.5	
Mutual funds	15.9	9.0	10.5	5.5	9.9	5.8	12.9
Life insurance	6.2	23.3	13.6	15.4	6.2	27.5	7.1
Pension funds	1.2	1.5	5.2	37.7	5.3	22.1	23.8
Others	5.6	6.9	10.3	3.8	4.3	3.7	2.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Adapted from Babeau and Sbrano, *Household Wealth in the National Accounts of Europe, the United States and Japan* (OECD 2003), tables 14 and 16.

however, it is striking that the composition of household wealth varied significantly across Europe at the beginning of the twenty-first century. Inevitably, the composition is influenced to a considerable extent by what is available. In the more 'mature' financial systems of the UK, USA and Netherlands, roughly 70 per cent of household wealth is held in equities, often indirectly through mutual funds, pension and life assurance companies. In countries where financial institutions are less highly developed and narrower in range, currency and bank deposits together with fixed interest instruments play a larger part. This is often reinforced by PAYG pension arrangements. In most of these characteristics, France appears in the middle of the sample.

As Table 6.9 shows, French households still maintain a very high level of liquid assets. The currency and deposits shown in Table 6.2 account for about 30 per cent of total financial wealth. When we look beyond that, for the role played by non-bank institutions, we see that life assurance companies play a significant role, approaching a quarter of financial wealth, followed by mutual funds, approaching 10 per cent. These companies make up the bulk of French non-bank financial institutions.

As in the UK, French mutual funds, *organismes de placement collectif en valeurs mobilières* (OPCVM) come in open- and closed-end form. The former are known as *fonds commun de placement* while the latter are *sociétés d'investissement à capital variable* (SICAVs). There are thousands of funds from which investors can choose, many of them general, but many also with specific investment objectives contained in their title.

The authorization of management companies lies with the *Autorité des Marchés Financiers*. The AMF, we have seen, was formed in 2003 by the merger of the *Commission des opérations de bourse* (COB), the *Conseil des marchés financiers* (CMF) and the *Conseil de discipline de la gestion financière* (CDGF). It was hoped that the result of the merger would be a regulatory body with a higher profile (better known to investors) and with greater effectiveness (a lower probability of a problem 'falling through the cracks'). Its visibility is important since one of its roles is to provide protection to investors in mutual funds. In this role, it oversees the accuracy of information given to investors and checks that management companies follow the rules for collective investments as required by their licence. A list of authorized management companies is available at [www.amf-france.org](http://www.amf-france.org). In March 2004 there were 518 such companies.

#### More from the web The AMF

The AMF, the *Autorité des Marchés Financiers*, is the regulatory authority for French financial markets. Its website can be accessed at: [www.amf-france.org](http://www.amf-france.org)

The website explains the history, the responsibilities and the powers of the AMF. But more useful are probably a glossary of terms relating to the mutual funds industry which can be accessed by clicking on 'OPCVM & produits d'épargne' on the home page.

The website is not very useful for statistical material. This is better found at [www.banquedefrance.fr](http://www.banquedefrance.fr) by clicking on 'statistics' and 'time series'.

While there are many similarities between the mutual fund industry in France and other countries, it is noticeable that the French system makes less of the distinction between SICAVs and FCPs than the US and UK systems make of the distinction between investment and unit trusts. For example, the distinction on which the AMF concentrates in its 'glossary of savings' (see 'More from the web: The AMF') is that investors in SICAVs are shareholders while investors in FCPs are not. There is no focus on the closed-/open-end nature of each. Equally, when it comes to balance sheet data the *Banque de France* divides mutual funds between 'general purpose', 'bond', 'equity' etc. funds but puts SICAVs and FCPs together under each heading. Table 6.10 summarizes this data.

As we saw in Table 6.9, the other major form of institutional saving in France occurs via insurance companies. These, and other financial firms offering protection and prudential services, have been regulated since 2003 by the *Commission de contrôle des assurances, des mutuelles et des institutions de prévoyances* (CCAMIP), formed from the merger of the *Commission de contrôle des mutuelles et des institutions de prévoyance* (CCMIP) and the *Commission de Contrôle des Assurances* (CCA).

As in many other countries, the French insurance industry is divided between firms (sometimes subsidiaries of universal banks) which specialize in either 'life' (or long-term) assurance or 'general' insurance. One way of comparing their relative sizes is to look at the total assets of each group. At the end of 2002,

**Table 6.10** French mutual funds, assets, end September 2003 (€m)

	Loans	Money market paper	Securities (excl. equity)	Equities and related	Fixed assets	Other assets	Total assets
General purpose	44,560	66,309	490,984	272,694	437	10,780	885,764
Bond and fixed interest	6,022	2,994	142,148	9,644	406	2,531	163,745
Equity funds	814	1,426	3,361	130,925	283	4,305	141,114
Diversified funds	6,714	10,787	66,234	107,106	31	1,893	192,765
Guaranteed funds	8,001	1,886	19,607	23,851	102	2,344	55,791

Source: [www.banquedefrance.fr](http://www.banquedefrance.fr), *Statistics – time series*.

### More from the web

#### French insurance companies on the web

The website of the insurance regulatory organization is at [www.cca.gouv.fr](http://www.cca.gouv.fr). This gives details on the history, powers and procedures of the CCAMIP. Beyond that, it has little of general interest about the insurance industry in France. This is better provided by the insurance companies' trade association, the *Fédération Française des Sociétés d'Assurance*. From its home page you can access a useful glossary of insurance terms called 'glossaire' (useful when it comes to reading other material on the site) and a section called 'Ressources' which offers a copy of the annual report (*Rapport Annuel FFSA*), statistics (*Statistiques*) and other items. The annual report is particularly helpful. It contains most of the useful statistics ([www.ffsa.fr](http://www.ffsa.fr)).

the value of life company assets was €779bn and that of general insurers was €101bn. The composition of those assets is shown in Table 6.11. Compared with the UK, it is noticeable that both types of insurer are less heavily committed to the equity market. The higher liquidity of general insurers, however, conforms to the general pattern – with predictable and long-term liabilities, life insurers have little need for liquidity.

Another way of comparing size is to look at the premium income earned by each group. In Table 6.12 we show the evolution of premium income for both over a period of years. This allows us to make some observation about the rate of growth in recent years.

The relative size of the two sectors is again confirmed. More interestingly, the impact of the fall in stock market values starting in 2000 is visible in bringing a sudden halt to the growth of life premiums. Remember that many of these premiums are buying long-term savings products whose value is based ultimately upon

**Table 6.11** French insurance companies – distribution of assets, end 2002 (%)

	General	Life
Cash and deposits	4.5	1.5
Loans	0.5	1.0
Fixed interest	53.0	70.4
Equities	30.5	22.9
Fixed assets	9.0	3.4
Other	2.5	0.8
Total	100	100

Source: *L'Assurance française en 2002*, Paris, Fédération des Sociétés d'Assurance, p. 85. 2003. Figures are also available on the Internet at [www.ffsa.fr](http://www.ffsa.fr) (FFSA, 2002).

**Table 6.12** French insurance companies – premium income, 1994–2002 (€bn)

	General	Life
1994	40.2	60.8
1996	42.0	75.5
1998	41.1	69.9
2000	43.5	96.9
2002	50.8	92.8

Source: *L'Assurance française en 2002*, Paris, Fédération des Sociétés d'Assurance, p. 78. 2003. Figures are also available on the Internet at [www.ffsa.fr](http://www.ffsa.fr) (FFSA, 2002).

the market value of the underlying assets in the fund. The impact on general insurance companies is much less marked. These premiums are mainly buying protection for houses and property which is required whatever the state of the financial markets. Allowing for inflation, the compound rate of real growth in

premiums over the period 1994–2002 is about 4 per cent per annum for life companies and about 1 per cent per annum for general firms.

With pension funds, we meet a characteristic which is similar to the case of Germany. The size of pension fund activity depends, naturally enough, on the extent to which savers build up funds during their working life in order to draw an income in retirement. This in turn depends to a large degree upon government social policy. In Germany and in France there has been a long tradition of state pension provision and in state schemes it is common for those currently retired to draw pensions paid for directly from the taxes and other contributions of those in work. Such schemes are known as ‘pay-as-you-go’ schemes and consist of straightforward transfers. No fund is accumulated and financial markets and institutions, consequently, are by-passed. The basic state pension in the UK functions in a similar way, but in the UK, because the state pension is paid at a very low level, many people belong additionally to an employers’ pension scheme and recently some have paid into private pension schemes of their own choosing. In both these cases contributions during working life accumulate in a fund which can be invested in long-term financial assets. To a considerable degree, therefore, the development, size and importance of markets for long-term securities like equities and bonds depend upon whether pensions are provided largely by the state (and therefore usually ‘unfunded’) or privately. In France, Germany and Italy, where the tradition of state pensions is strong, the pension fund sector is comparatively underdeveloped. This is a situation that is slowly changing because of demographic pressures. The feasibility of a pay-as-you-go scheme depends critically upon the age structure of the population. If, say, seven or eight workers are paying taxes to support one retired person, the individual tax burden is acceptable; it may not be acceptable if the population as a whole ‘ages’ and each pensioner has to be supported by only three or four working taxpayers. Ageing populations are a characteristic particularly of Germany, but also at the moment of France and Italy.

#### 6.4 Financial markets in France

The high degree of regulation to which the French financial system was subject until recently affected financial markets as well as institutions. This regulation helped to

maintain sharp segmentation between institutions and limited the development of securities markets. (Before 1985, there were no money market securities and the French ‘money market’ was, in effect, simply an inter-bank market.) Several consequences naturally followed. Firstly, financial assets available to the general public were highly liquid, consisting either of ‘money’ or of savings deposits. From this, in turn, it followed that banks and other financial intermediaries played a more important role (compared to markets) in the French financial system and that they had to perform a higher degree of maturity transformation than intermediaries in systems where securitization was commonplace.

As in the UK, securities trading goes back many centuries. An Order of the Royal Council of State authorized a Paris stock exchange in 1724. However, the Revolution saw many upheavals (including a brief ban in 1795) and it is easier to date its recent history from 1801. For most of the nineteenth century, its fortunes went hand in hand with the liberalization of company law that facilitated the incorporation of joint stock companies (1867 and 1900). As we noted earlier, the French government took several steps to modernize the financial system during the 1980s and on the securities front this involved the setting up of the *Marché à Terme International de France S A* (MATIF) and the *Marché des Options Negotiables de Paris S A* (MONEP). The former was a futures exchanges offering contracts on government bonds and later on commodities while the latter was an equity options exchange. A 1988 Act reformed the (main) stock exchange, bringing provincial exchanges under its control and naming it the *Société des Bourses Françaises S A* (SBF). The same Act opened up membership of the market to a wide variety of institutions including international banks (in a manner similar to the UK’s ‘Big Bang’). On 1 June 1999, the four French market operators, MONEP, MATIF, SBF and the recently formed *Société du Nouveau Marché*, for newly incorporated firms, merged to form a new company, *ParisBourse<sup>SBF</sup> S A*. At this point, trading in virtually all French securities came under one market administrator.

More recently, in 2000, the exchanges of Brussels, Amsterdam and Paris merged to form *Euronext*, a holding company (based in the Netherlands) of which *Euronext Paris* is a subsidiary. At the beginning of 2002, the *Euronext* group expanded further with the acquisition of the London International Financial Futures Exchange (LIFFE) and the Portuguese Stock Exchange in Lisbon.

### More from the web History of the Paris Bourse

A more detailed history of securities trading in Paris, including the latest developments involving *Euronext*, can be found at: [www.euronext.com](http://www.euronext.com). Click on 'About us', then 'business' and then 'history'. The history of individual exchanges can be accessed from here.

At the time of writing, the Euronext homepage lists 'other euronext exchanges' on the left-hand side. Clicking on 'Paris' takes you to the Euronext Paris website. Clicking on 'Indices and Statistics' gives access to a large amount of information about the Paris market. A useful place to start is with 'annual statistics'. This is the source for most of the statistics used in this section.

The section on education/information contains a wide range of documentation explaining the operation of the market at a practical level. 'Euronext: organisation and procedures' is a good place to start.

Table 6.13 gives a number of statistics relating to cash trades in bonds and equities during (or at the end of) March 2004, for both the main and new markets. Trading in fixed income securities ('bonds') is confined almost entirely to the main market and accounted in 2003 for only about 1 per cent of the total value of trading. Trading in corporate bonds accounted for about 85 per cent of total bond turnover. 2003 was the last of three rather depressed years in French (and other) security prices, so it was not a very attractive environment in which to raise new funds. Nonetheless, 23 firms took the opportunity to raise €6.25m. It is a bit misleading to compare this flow of newly raised funds in the course of a year with

the one month turnover figure in Table 6.13 when recovery was under way. Nonetheless, it shows that French security markets, like others, are dominated by secondary trading. Only a very small fraction of sales involve raising new capital.

As in the UK (see Table 6.9), direct shareholding plays a relatively small part in the portfolios of French households. Investment in equities is indirect via the mutual funds and insurance companies that we saw in the last section and trading in equities accordingly is dominated by these institutions. In the terms that we use in Section 16.6, the *Euronext Paris* markets (like most continental bourses) work on the basis of electronic matching or orders. For the most frequently traded securities the matching is 'continuous' in the sense that the pacing of a buy or sell order will be carried out immediately provided that there is a matching order already on the book. For less liquid securities orders are accumulated and dealt with in two batches (at 10.30 and 4.30). As we explain in Section 16.6, this auction or order-driven type of trading does away with the market-maker, the firm that holds stocks of equities on its own account, and quotes continuous prices at which it is prepared to deal. The participants on the *Euronext Paris* markets are broadly of two kinds. The first are 'trading members'. These include duly authorized credit institutions, brokerage houses and investment companies that have become market members in order to execute buy and sell orders on the market. Depending on the type of authorization granted, they may trade on behalf of clients and/or on their own account. Clearing members, as their name suggests, are responsible for seeing buyers receive the securities and sellers receive payment within the time specified by market regulations.

**Table 6.13** Securities trading in France (March 2004)

	Main market	New market
No. of listed shares – domestic*	255	133
– foreign*	106	9
No. of trades (ave. per day)**	405,710	11,021
Value of trades (ave. per day)**	€4.63bn	€15.5m
Ave. value of trades**	€11,412	€1,406
Capitalisation*	€1,043bn	€6bn

Notes: \* end-month; \*\*during the month.

Source: [www.Bourse-de-Paris](http://www.Bourse-de-Paris), *Indices and Statistics*.

Despite all these changes, however, the balance sheets of French firms still show a heavier reliance upon bank-intermediated finance than their counterparts in the UK and USA. Consequently, the savings of French households are still concentrated in bank liabilities, though money market assets, held indirectly via mutual funds, have taken an increased share in recent years. We shall see that equity and bond (direct plus indirect) holdings play a larger role than they do in Germany but they are unlikely to reach UK and USA proportions until funded pension schemes become the norm.

### 6.5 The development of the Italian financial system

In the terms of the discussion on financial systems in Section 2.2, the Italian financial system is clearly bank-based rather than market-based. Firms have raised funds principally through the banking system. Founding families continue to play an important part in the ownership of many firms, limiting the role played by the equity market. Takeovers and mergers remain relatively uncommon except for the large numbers that have taken place in the banking sector in recent years as part of the restructuring of that sector. The bond market remains predominantly a market in government bonds and has in the past contributed little to corporate finance. The relationship between banks and firms has typically been close and important. Thus, the Italian system has similarities with the other systems in continental Europe, although it also has a number of individual features.

As with the USA, the basis for the development of the system for the following 60 years was laid in the 1930s. Italy had only become a united country in 1870 and, by the standards of Northern Europe, much of it was economically underdeveloped. Its social and economic history had left it with a shortage of private capital willing and able to engage in banking. Prior to the 1930s there had been a succession of bank failures and financial crises and the position deteriorated during the economic crisis of the 1930s. The Italian response was strikingly different to that of the USA in that public intervention frequently followed and, as a result, most of Italy's banks became state-owned, either directly or under the control of charitable, non-profit-making foundations that were themselves government supervised.

However, the *Banking Act, 1936*, derived from the same determination to ensure the stability and security of the system which had been the driving force behind the 1933 Glass–Steagall Act in the USA – and it followed much the same approach. The law created a rigid demarcation between financial institutions in providing corporate finance. Commercial banks (standard credit institutions) were only allowed to conduct short-term (up to 18 months) deposit and lending business while medium- and longer-term financing was to be provided by investment banks (special credit institutions). This distinction existed nowhere else in Europe. Commercial banks were given slightly more freedom than this suggests since they could grant medium-term loans not exceeding eight per cent of their deposits as long as loans to any one institution did not rise above 15 per cent of capital, but any such loans had to be individually authorized by the central bank, the *Banca d'Italia*. Banks were also prohibited from acquiring participating interests in industrial companies and the development of branch networks was discouraged by the *Banca d'Italia* which demanded evidence that there were valid economic reasons for any such expansion.

The banking system that developed was one with a very large number of small local banks that faced very little competition. As a consequence, banks became very bureaucratic and did not provide a high level of service. Savings products provided by the banking system were few and unsophisticated. In the larger public sector banks, as in most parts of the Italian state, appointments of top officials became highly politicized and the banks had little chance of raising share capital.

The structure of Italian capitalism also contributed to the way in which the financial system developed. The family remained central to the operation of capitalism much longer than in comparable countries. The average size of firms remained small. Even today, over 50 per cent of Italian manufacturing firms employ fewer than 100 workers. This is true of under 20 per cent of manufacturing firms in the UK. Many of the larger firms continued to have large family shareholdings. This is still true of firms such as Fiat, Pirelli, Olivetti, Benetton and Gucci. Many other large Italian firms were owned either directly or indirectly by the state. Under these circumstances there was very little call for an equity market and, although it has been strengthened over the past 20 years, its contribution to the growth of the Italian economy has been small.

Following the formation of the EU in 1957, the Italian economy grew very rapidly. However, when growth rates in all Western economies turned down in the 1970s, much of the burden in Italy fell upon the Italian state, especially since much of the country's heavy industry was state-owned. Continuing regional problems and public attitudes made it difficult for the government to finance increased expenditure through high taxation and Italy embarked upon a series of large budget deficits. Savings ratios in Italy were high and, given the unsophisticated nature of savings vehicles provided by the banking system and the existence of exchange controls that made it difficult for capital to leave the country, the government was able to finance its deficits through the domestic sale of securities, although at an increasing cost in terms of interest rates and payments. The bond market became entirely dominated by government debt.

Firms seeking capital either provided it themselves through retained earnings or entered into special relationships with investment banks. One such bank, *Mediobanca*, a government-controlled bank in Milan, became central in financing operations and oversaw the development of close relationships among a number of the country's largest private firms. This was in part a response to the lack of development of bond and equity markets but contributed to the continued slow development of those markets.

It was not until the late 1980s that things began seriously to change. The pressures for deregulation that we have noted in other countries gradually came to be felt in Italy. Pressure for reform came also from the Italian employers' association, *Confindustria*, which argued that inefficiencies in Italian banking threatened the long-term viability of Italian manufacturing. The Italian Bankers' Association drew attention to unsystematic *ad hoc* lending criteria and undisciplined loan-monitoring procedures. The *Banca d'Italia* acted in a number of ways to try to bring Italian banking practices into line with the rest of Europe. The requirement that commercial banks needed special authorization from the *Banca d'Italia* to grant medium- or long-term loans was removed. Administrative controls and regulations on the investment of banks' funds in government securities began to be revoked from 1984 on. As soon as the law allowed, the central bank fostered competition by encouraging the merger of smaller credit institutions and, after May 1990, it discontinued the policy of limiting and controlling branch networks. A large increase in the number of bank branches followed.

The gradual reduction in restrictions on capital outflow under the terms of the Single European Act, culminating in the removal of the final foreign exchange control by the end of June 1990, had profound effects. Italian financial institutions now had to compete for the funds of Italian savers with foreign savings products; foreign banks increased their presence within Italy. This occurred first in investment banking, with Italian government bond trading becoming dominated by foreign houses including J P Morgan, Morgan Stanley and Salomon Brothers. Later, Deutsche Bank and other EU banks began to make inroads into the retail market. Italian banks sought to diversify by granting medium- and long-term loans through special subsidiaries and by engaging in near-banking business such as leasing and factoring. Agreements between commercial and investment banks and insurance companies provided for the marketing of the financial products of other institutions.

It was clear that the 1936 Banking Act had to be replaced. A bill to reform the act was tabled in parliament in 1989 but the new Banking Act was not passed until 1 September 1993, coming into force on 1 September 1994. This law, however, incorporated a number of legislative and administrative changes that had been made from 1990 on. Perhaps the most significant of these was the *Legge Amato* (Law no. 218) of 30 July 1990 which authorized the transformation of public banks into limited companies, establishing the full legal parity of public and private financial intermediaries, on the principle that all banks are business firms. In May 1993, banks were allowed participating interests in industrial companies up to the limit of 15 per cent of their own funds. The *Banking Act, 1993*, removed the distinction between short-term and medium- and long-term lending. It also introduced a separation between the banks themselves (now all private law limited companies) and the public foundations owning shares in those banks. The foundations were allowed to sell or exchange shares, leading to increased concentration. The law thus led to the existence of bank holding companies with subsidiaries providing medium-term lending, insurance and other financial services. It was hoped that this would result in four or five large financial institutions able to compete internationally.

This became more urgent with the translation into Italian law of the EU's *Second Banking Directive* towards the end of 1995. This was followed by a rush of notifications of intent to offer banking services in Italy from banks based in other EU countries.

The *Consolidated Law on Financial Intermediation*, 1998, allowed financial intermediaries to offer a wider range of asset management products. Competition intensified as more banks entered the same markets and the presence of foreign intermediaries increased. The increased competition led to a reduction in the spread between bank lending and deposit rates. This fell from 6 to 4 percentage points between the beginning of the 1990s and the end of 2002.

## 6.6 The current position of the Italian financial system

### 6.6.1 The banking industry

The Italian banking system has, in recent years, undergone a major restructuring since the late 1980s. Although there are still many banks, mergers and acquisitions have reduced their number from 1,176 in 1989 to 814 at the end of 2002. As Table 6.14 shows, the reduction in numbers has been among the small cooperative and mutual banks whereas limited company banks have increased in number through the processes of mergers and acquisitions and privatization. Between the end of 1990 and 2002, there were 566 mergers and acquisitions among banks. The target banks in the mergers and acquisitions accounted for nearly 50 per cent of total bank assets. The process of consolidation slackened in 2001 but regained momentum in 2002 when there

were 29 mergers and acquisitions, involving institutions holding 5 per cent of the total assets of the system.

The ownership of banks has become rather more concentrated than is suggested by the simple reduction in numbers shown in Table 6.14 through the development and growth of banking groups. By the end of 2002, 78 groups encompassed 231 of the 814 banks. This still meant that there was a total of 661 banking groups and individual banks but more than 80 per cent of all bank branches belonged to the banking groups.

There have been a number of high profile privatizations in the finance industry since December 1993 when IRI, the large government-owned holding company, sold its 64 per cent stake of ordinary stock in *Credito Italiano*. Other early part or full privatizations included *Banca Commerciale Italiana*, IMI, a Rome-based banking and financial services group, and the investment bank, *Mediobanca*. The withdrawal of the public sector from control of the finance industry was slow in comparison with the programmes of privatization elsewhere but sped up in the late 1990s, and the years 1997 and 1998 saw the privatization of a number of the larger banks: *Cassa di Risparmio delle Provincie Lombarde*, *Banca Nazionale del Lavoro*, *Banco di Napoli*, *Banco di Roma* and *Istituto Bancario San Paolo di Torino*. The result was that between 1993 and 2002, the share of bank assets possessed by banks controlled by the state or by charitable foundations fell very sharply – from 70 per cent to 10 per cent. The privatization of the remaining banks still in the public sector or under the control of charitable foundations is continuing.

**Table 6.14** The Italian banking system – numbers of banks and branches in Italy

	at end 1995		at end 2002	
	Number of banks	Number of branches in Italy	Number of banks	Number of branches in Italy
Limited company banks <sup>1</sup>	203	16,744	253	22,924
Cooperative banks (banche popolari)	96	4,239	40	3,704
Mutual banks (banche di credito cooperativo)	619	2,379	461	3,192
Branches of foreign banks	52	78	60	106
Total	970	23,440	814	29,926

<sup>1</sup> includes central credit and refinancing institutions.

Source: 1995: Banca d'Italia, *Annual Report 1995*, table 4.5, and 2002: *Annual Report 2002*, table 57.



The result of these changes has been the development of banking groups similar in size to many of their European competitors. The three largest have centred around three of the banks privatized in 1997–98: *Cassa di Risparmio delle Provincie Lombarde*, *Istituto Bancario San Paolo di Torino* (which merged with IMI) and *Credito Italiano*.

The aim of the formation of banking groups is to preserve brand names while obtaining the benefits of the coordinated monitoring of risks, the curbing of costs and the integration of policies for the production and marketing of services. These three banking groups are now among the 15 largest banks in the euro area. None the less, the market share of the top five groups increased only slightly in 2002 and even the large banks remain small by international standards. They account for 55 per cent of total Italian banking assets but only a little over 5 per cent of total EU banking assets compared with 13 per cent, 12 per cent and 10 per cent for the five largest banks in Germany, France and the UK respectively. Before the recent EU expansion to 25 countries, the assets of the whole

Italian banking sector made up only 9 per cent of the EU total although Italy contributed around 14 per cent of EU GDP.

Following the removal of restrictions on the development of branch networks, the total number of bank branches has been increasing steadily, rising from 23,440 at the end of 1995 to 29,926 at the end of 2002. This was more than double the number of bank branches (12,174) in existence in 1980. Thus, the tendency for banks to reduce the size of branch networks evident in the UK has yet to develop in Italy. The great growth in the number of branches in Italy reflects the previous underdevelopment of the Italian system and the limitations imposed until 1990 on the formation of new branches by the *Banca d'Italia*.

Table 6.15 shows the principal assets and liabilities of Italian banks at the beginning of 2004 and the percentage changes in the various categories for the years 2002 and 2003. Noteworthy here is the relatively slow growth in deposits and the switch towards liabilities in the form of bonds. This has occurred across the whole of the euro area since the introduction of the

**Table 6.15** Assets and liabilities of Italian banks (*end-of-period data; 12-month percentage changes; €m*)

	% change 2002	% change 2003	Stocks, January 2004
<b>Assets</b>			
Securities	-15.6	4.7	177,743
<i>of which: govt securities</i>	-19.8	-4.3	105,217
Loans	6.3	6.7	1,090,100
<i>of which<sup>1</sup>: short term (a)</i>	0.5	-1.5	447,126
<i>medium and long term (b)</i>	11.7	13.3	582,939
(i) + (b)	6.1	6.2	1,030,065
<i>repos</i>	-7.2	-1.1	2,985
<i>bad debts</i>	1.9	10.1	51,591
External Assets	22.7	0.1	222,170
<b>Liabilities</b>			
Deposits	6.7	2.2	686,575
<i>of which<sup>2</sup>: overnight</i>	7.2	5.9	509,007
<i>with agreed maturity</i>	-8.6	-10.2	43,838
<i>redeemable at notice</i>	5.4	5.1	64,686
<i>repos</i>	17.2	-15.7	63,374
Bonds	10.3	8.6	398,640
External Liabilities	-4.1	10.1	296,496

<sup>1</sup> minor items in the aggregate are not reported; <sup>2</sup> excluding those of central government.

Source: Banca d'Italia, *Economic Bulletin*, 38, March 2004, table 30.

euro. Between the end of 1998 and the beginning of 2004, bonds rose from 24.0 per cent of Italian bank liabilities to 28.9 per cent.

Until recently, Italy's banks were the least profitable in Europe with a very low return on equity (ROE) compared with European competitors. The low profitability of Italian banks over a long period had been explained by their heavy dependence on traditional loan income with only small amounts of revenue coming from commission or other fee-based income and by their high staff costs. An additional reason for the lower rate of return in Italy had been the higher rate of direct taxation. However, the tax burden was eased by the application of dual income tax from 2000 onwards and reductions in the rate of the regional tax on productive activities that took effect from 2001.

During the early and middle years of the 1990s, the capital bases and the profitability of banks declined. Each year from 1994 to 1997 the 10 largest banks recorded an overall net loss, owing in part to loan losses generated in the past recession. Corporate finances had deteriorated sharply in 1992 and 1993, there had been a crisis in the construction and public works sector and property values had fallen. The long stagnation of the southern Italian economy had continued. In addition, in the middle years of the decade there were high restructuring costs involving voluntary redundancy payments needed to bring about staff reductions. Yet again, the ambitious strategy of mergers, acquisitions and expansion of branch numbers initially led to low earnings retention and declining profit margins because of the poor state of many of the banks acquired. The low profitability and weak capitalization, in turn, had an adverse effect on credit ratings.

However, the performance of the larger banking groups in particular improved considerably in the late 1990s and, overall, the profitability of the Italian banking system moved closer to the European average. In 1995, the average rate of return on equity for all

Italian banks was only 4.13 per cent. This had risen to 7.4 per cent by 1998, in comparison with 14.0 per cent in Spain, 10.2 per cent in Germany and 8.3 per cent in France. In 2000, the return on equity rose to an average of 12.9 per cent. Among the main banking groups, it was as high as 17.1 per cent but the 9.7 per cent figure for the rest of the system represented a very great improvement over the performance only a few years earlier. The recovery in profitability stemmed from the supply of a wider range of services and improvements in operating efficiency. During the second half of the 1990s, the proportion of gross income generated by services and trading in securities and foreign currencies rose from 26 to 43 per cent. This was partially the result of the programme of mergers and acquisitions, which enabled the larger banks rapidly to expand their asset management and business services.

Following large staff reductions, staff costs began to fall relative to bank earnings. In 1996 the banks' per capita labour costs had been 31 per cent higher than the average in Germany, France and Spain but the gap narrowed to 17 per cent in 1998. A new national labour contract for the banking industry came into effect in November 1999, restraining wage increases and automatic seniority increments. Action plans were agreed to make work organization more flexible, improve training and upgrade employees' skill levels. In the mid-1990s staff costs were equal to 45 per cent of gross income, significantly higher than for banks in other large countries. By 2000, the figure had fallen to 36 per cent.

In 2001, the results of financial intermediaries were affected by the poor performance of the financial markets. Banks' profits declined because of the decline in asset management fees and the need for substantial provision for bad debts. The average return on equity for the system fell to 9.1 per cent. The continued poor performance of the economy and the financial markets in 2002 saw this drop further, with the impact falling principally on the large banking groups. The average return on equity fell to 6.4 per cent (6.0 per cent for the main groups). The fact remained that the Italian banking system was in a much better position to withstand the cyclical downturn than it would have been in the middle 1990s.

The performance of the Italian banking industry is influenced by the strong north-south difference. The weak economy of the south led to crisis in the credit system in the early 1990s, with bad debts up to three times higher than in the north. Two of the largest

#### More from the web

The Bank of Italy website, [www.bancaditalia.it](http://www.bancaditalia.it), provides almost everything you are likely to want in relation to Italian banking – articles, speeches, statistics and comments on the world, euro area and Italian economies. There is an English-language version. The *Economic Bulletin* is particularly useful. Go to the home page and click on 'Publications'.

banks in the area, the *Banco di Napoli* and *Sicilcassa*, ran into serious trouble. The *Banco di Napoli* had to be rescued from a liquidity crisis with huge loans from the Deposits and Loans Fund and from leading banks. In addition, parliament authorized the Treasury to subscribe additional increases in the bank's capital. *Sicilcassa* was taken into special administration. Other smaller banks in the south also found themselves in trouble. Many interventions by the supervisory authorities aimed at avoiding interruption to the supply of financial services in the areas concerned and at transferring sound credit positions to other banks. This often led to banks located in the south being taken over by banking groups whose parent companies are based in the centre and the north. Ownership of the industry is now heavily concentrated in the north.

Banking and other financial services remain much less developed in the south. The growth in the number of bank branches has reduced the number of inhabitants per bank branch for Italy as a whole to below 2,300 – this is approximately the same as in France but well above the figures for Spain and Germany. However, within Italy, there is a marked difference. In the north and centre there is a bank branch for every 1,900 inhabitants as against 3,600 in the south and islands. The lower level of competition together with the higher proportion of bad debts means that interest rates on short-term loans are around 2 per cent higher in the south on short-term loans, although the difference is rather less for medium- and long-term loans. The gap between deposit and lending rates is around 6 per cent in the south compared with a gap of 4 per cent in the rest of the country.

### 6.6.2 The banking authorities

The *Banca d'Italia* was until the beginning of 1999, as the Bank of England was until 1997, the bank of issue and the government's principal banker. It also played a role in the supervision of the Italian banking system. It retains the last two of these three roles, having become a member of the European System of Central Banks (ESCB) and having passed over its monetary responsibility to the ECB.

The *Banca d'Italia* was founded in 1893 as a private company but became part of the public sector in 1936. It derives its primary role as responsible for monetary stability from article 47 of the 1947 Italian constitution. This is a vaguely worded article which

does not mention the *Banca d'Italia* by name but talks of encouraging savings and controlling credit.

Until 1992, the *Banca d'Italia* was far from being independent of government. The *Comitato Interministeriale per il Credito e il Risparmio* (CICR) was responsible for monetary policy issues and bank supervision policy. It was made up of the Treasury, Finance and other economic ministers, with the governor of the *Banca d'Italia* only being present at meetings in an advisory capacity. The Minister of Finance, together with the Minister for Trade, was responsible for all foreign exchange policy decisions and appointed or dismissed presidents of public banks in consultation with the political parties. The problem of financing the government's large budget deficits led to regular conflicts between it and the *Banca d'Italia*. Until 1981 the *Banca d'Italia* was required to take into its own portfolio any government securities not taken up by the market. Although this requirement was annulled, the government continued to make constant use of a cash advance facility which obligated the *Banca d'Italia* to provide up to 14 per cent of projected budgetary expenditure. In January 1983 the *Banca d'Italia* made use of a 1948 legislative decree under which, when the Treasury persistently exceeded the limits of the cash advance facility, it could suspend its payments to the Treasury and force Parliament to resolve the conflict between the central bank and the Executive. Parliament responded by approving legislation requiring the *Banca d'Italia* to grant the Treasury extraordinary additional finance.

As required for membership of economic and monetary union, steps were taken in the first half of the 1990s to increase the power of the central bank relative to that of the elected government. In February 1992, the authority to determine the discount rate was transferred from the Minister for Finance to the central bank and in June 1994 the *Banca d'Italia* assumed responsibility for determining minimum reserve policy. For a time, however, government continued to attempt to influence the bank through the method of appointment of its top officials. The *Banca d'Italia's* executive directorate is composed of the governor (who has no fixed term) and three other members, all of whom are chosen by the governing council on which sits the bank's 13 regional office chairmen. Appointments must, however, be confirmed by the Italian President in consultation with the government. A conflict over bank appointments occurred in 1994 when the government used its power to veto the appointment of Tommaso

Padoa Schioppa to the executive directorate of the bank but could not then enforce the selection of its own preferred candidate. Instead, the *Banca d'Italia* was able to appoint a substitute for Padoa Schioppa from within its ranks. No conflict of this kind has since arisen. Padoa Schioppa later became the Italian member of the Executive Board of the ECB.

As supervisory authority, the *Banca d'Italia* evaluates proposed consolidation projects and monitors their implementation. It assesses the adequacy of risk measurement and management systems and calls on parent companies to take prompt action to rationalize branch networks and integrate information systems and procedures. The bank has the power to investigate in cases where increased concentration may reduce competition. It can issue warnings to banks, can order compensating measures such as the closure or sale of branches or a temporary ban on the opening of new branches and, where anti-competitive behaviour is found, can levy fines on the banks involved. The bank has played a major role in encouraging and supervising the restructuring of the Italian banking sector.

### 6.6.3 The securities industry

The potential for securities markets in Italy has been high for a long time because Italian savings have been second in volume only to those of Japan. Savings ratios have been falling in recent years but remain high by international standards. The national saving rate of the Italian economy in 2002 was equal to 19.9 per cent of GDP, down from 22.5 per cent in the 1980s but still higher than the average for the Group of Seven countries. The propensity of Italian households to save fell from 21 per cent of disposable income in 1983 to 16.6 per cent in 1993 and then further to 13.2 per cent in 1999, before recovering slightly in 2001 and 2002. However, this remains high by international standards. It is much higher than household savings rates in Germany, the United Kingdom and the United States. Among the main industrial countries, it is second only to that of France. Italian households also stand out by international comparison for the low level of their debt. Although the liabilities of households have risen considerably in recent years, largely for the purchase of housing, the ratio of financial liabilities to assets in 2002, at 16 per cent, remained well below the figures in other major industrial countries (28 per cent on average for the main euro area countries in

2001, 25 per cent in the USA and 29 per cent in the UK). However, Italian savings products have until recently been unsophisticated and only a small proportion of Italian savings has in the past been professionally managed.

The large budget deficits of the 1970s and 1980s led to securities markets being dominated by the market for public debt. From 1980 to 1991, that debt grew almost sixfold; relative to national income it rose from 59 per cent to 102 per cent. By 1996, General Government Gross Debt was 123.4 per cent of GDP. This limited the development of the equity market and accentuated the corporate sector's preference for bank or internal sources of financing. The Italian government debt market is now the third largest in the world in nominal terms, behind those of USA and Japan. Until recently, most of the relatively small number of private bonds have been issued by publicly owned companies such as public banks or the Italian state railways. Bonds directly issued by the corporate sector have represented only a tiny proportion of the total amount outstanding. At the end of 1995, 88.2 per cent of the total stock of outstanding bonds and government securities consisted of public sector bonds or bills. Banks had been responsible for the issue of 10.5 per cent of the stock and firms for only 1.5 per cent.

After 1996, as part of the Italian government's drive to meet the convergence criteria for membership of economic and monetary union, the public sector deficit began to fall. The general government net borrowing requirement fell to 1.8 per cent in 2000 before rising again to 2.4 per cent in 2003. By 2003, government debt had fallen back to 106.2 per cent of GDP. This reduction in the need for the public sector to sell new debt provided some scope for the re-emergence of a corporate bond market.

In common with the rest of the euro area, the Italian bond market has grown considerably since the launch of the single currency. Between 1998 and 2002 the ratio to GDP of the stock of resident companies' bond issues on the domestic and international market rose from 28 to 47 per cent in Italy but much of this growth has been attributable to banks, which use the proceeds of bond issues to fund their loans, as Table 6.16 shows. Non-financial firms have been increasing their use of the bond market but still do so far less than do American firms. Between 1998 and 2002 the stock of securities issued by non-financial firms rose from 3 to 7 per cent in Italy and from 5 to 8 per cent in the euro area as a whole while in the USA it rose from 25 to 29 per cent.

**Table 6.16** Outstanding bonds of Italian and euro area companies (as a percentage of GDP)

	1998	2002
<b>Italy</b>		
Banks	25	32
Other financial companies	0	7
Non-financial companies	3	7
Total	28	47
<i>of which: international market</i>	4	20
<b>Euro area</b>		
Banks	36	43
Other financial companies	3	8
Non-financial companies	5	8
Total	44	59
<i>of which: international market</i>	16	40

Source: Banca d'Italia, *Economic Bulletin*, 37, November 2003, table 1, p. 88.

In 2001, bonds amounted to just under 2 per cent of non-financial firms' total financial liabilities, similar to the proportion in Germany but far smaller than in France (6 per cent), the UK (9 per cent) and the USA (14 per cent). By international standards the corporate bond market in Italy remains underdeveloped. In 2003, Italian corporate bond issues fell back slightly, against the euro area trend, following the collapse of the two large Italian industrial groups Cirio and Parmalat.

The securities issued by the Treasury are of standard types ranging from Treasury bills to floating rate issues. Denominations are small enough to allow private investors to participate in the fortnightly auctions through financial intermediaries. The result is that over three-quarters of the public debt consists of securities placed in the domestic market with the greater part held by households, firms and institutional investors. Investment in government securities has spread to all the different components of society: around 40 per cent of pensioners hold government securities, as do more than 35 per cent of white-collar households and nearly 25 per cent of blue-collar households.

The market was reformed in 1988, with a group of institutions becoming market makers quoting bid-offer prices on various bonds as in the UK and USA. Previously, Treasury bonds had been sold by banks forming a consortium and subscribing to a whole issue even if at prices below the equilibrium level. There

had been government arm-twisting of financial intermediaries to ensure the sale of bonds. The market was reformed in part because of the perceived need to attract foreign investors following the removal of exchange controls which increased the possibility of Italian savings flowing abroad.

There has indeed been a considerable growth in non-resident holdings of government securities in recent years. In 1996, non-residents owned only 15 per cent of Italian public sector securities. By the end of 2003 this had grown to 48.9 per cent. In 1988 also an efficient screen-based secondary market for government securities, the MTS, was established. This has now been privatized and around 200 Italian and foreign intermediaries engage in the trading of Italian government bonds and those of other EU governments. In addition, there are retail markets for government and corporate bonds.

Change has been slower to come in equities markets. By April 2004, there were still only 275 companies listed on the Italian stock exchange in Milan in comparison with 848 listed companies in Germany. The relatively underdeveloped state of the Italian stock market is also shown by its capitalization. At the end of 1999, the ratio of the value of listed companies to GDP was 66 per cent compared with 90 per cent for the euro area as a whole. In the USA and the UK the ratio is double that for the euro area.

The equity market had grown in the 1980s and 1990s, but progress had been slowed by the way in which the stock exchange operated. A 1913 law had given a monopoly over transactions to brokers. They were meant to be pure brokers, acting only as agents. However, the market did not work well in the late 1980s. No one was compelled to use the stock exchange and only 20 per cent of transactions went through the exchange; the average availability of a company's share capital on the market was very small. The official market was thus thin and speculative and was a market for insiders. There were no rules of conduct or investor protection. Specifically, there was no law on insider trading and no rules requiring public takeover offers. This all led to many complaints that share deals were frequently rigged by big groups, that small investors were crucified and that the market was characterized by secret pacts and the atmosphere of a private club. A new bill was presented to parliament in 1989 requiring transactions in equities to go through authorized intermediaries on the official market. The distinction between brokers and market-makers disappeared. New

firms became market-makers, brokers, and fund managers with Chinese walls being required.

Despite these changes, there were only small increases in the number of companies listed on the *Borsa Italiana* in Milan in the 1990s and the early part of this century and the gap with respect to the other euro area countries in terms of the number of listed companies continues to widen. Most of the increase in activity that has taken place in the Italian equities market has been associated with the newly privatized companies, particularly those in the banking sector. Studies seeking to identify the reasons for the limited growth of the Italian stock exchange highlight the limited supply of shares: businessmen's fear of losing control and reluctance to disclose the information laid down for listed companies discourage them from going public. As in other countries, a new market, the *Nuovo Mercato* (NM) has been established for the listing of high technology stocks. This market is part of a European circuit in which the shares of 400 high technology companies are traded but remains small in itself.

#### 6.6.4 Institutional investors

The late 1980s and 1990s saw a marked growth in the professional management of savings. According to the *Banca d'Italia's* survey of household income and wealth, between 1995 and 1998 the proportion of households entrusting their financial savings to investment funds or portfolio management services rose from 5 to 11 per

cent, while the proportion of those investing in life insurance products increased from 21.5 to 23.3 per cent. Between the end of 1996 and the end of 2000 assets under management in Italy in individual and collective investment portfolios nearly tripled to just over €1,000m with investment funds accounting for 58 per cent of the increase. This growth in households' demand for individual and collective asset management services was abetted by the passing of the 1998 Consolidated Law on Financial Intermediation, which created a new institution, the asset management company. This has allowed banking and financial groups to rationalize their presence in the various sectors of activity. From the end of the 1990s there was a rapid growth in asset management companies. These companies provide individual portfolio management services for a growing number of banking groups as well as managing a large part of the portfolios of Italy's main insurance companies. The growth of Italian investment funds is shown in Table 6.17. The decline in the value of portfolios after 2000 reflects the sharp decline in international financial markets. By September 2003, units of Italian investment funds accounted for 13.3 per cent of the financial assets of households, having made up only 2 per cent of that total in 1990. This can be seen in Table 6.18, which shows the stock of financial assets of Italian households and non-financial enterprises.

Within the investment funds sector, a fall in bond prices in 1999 and 2000 encouraged a shift of savings into equity funds. At the end of 2000 there were around 1,000 equity funds in operation, twice as many as at

**Table 6.17** Italian investment funds: securities portfolios (€m)

Year	Residents				Non-residents	Other financial assets	Total portfolios
	Govt securities	Corporate bonds	Shares	Total			
1997	101,783	2,939	20,353	125,075	45,773	83	170,931
1998	193,301	4,164	39,419	236,884	107,542	111	344,537
1999	161,564	8,012	44,642	214,218	233,621	268	448,106
2000	126,604	7,357	44,279	178,240	240,024	1,981	420,245
2001	122,306	10,793	26,053	159,152	210,577	151	369,881
2002	129,505	10,342	18,123	157,970	158,255	108	316,333
2003	141,183	11,138	16,783	169,104	168,358	138	337,600

Source: Banca d'Italia, *Economic Bulletin*, 32, March 2001, table a31 and 38, March 2004, table a38.

**Table 6.18** Stocks of financial assets of households and non-financial enterprises at 30 September 2003 (€m)

Assets	Households	Non-financial enterprises	Total
Cash and sight deposits	441,390	117,243	558,633
Other deposits	280,103	9,697	289,800
Short-term securities	7,338	72	7,410
Medium and long-term securities	541,378	30,177	571,555
<i>of which: government securities</i>	200,315	11,998	212,313
<i>corporate securities</i>	35,401	6,965	42,366
Investment fund units	330,750	4,600	335,350
Shares and other equities	262,768	777,713	1,040,481
External assets	203,146	277,012	480,158
Other financial assets <sup>1</sup>	425,971	243,757	669,728
<b>Total</b>	<b>2,492,844</b>	<b>1,460,271</b>	<b>3,953,115</b>

<sup>1</sup> includes insurance reserves of life and casualty sectors and pension funds for households and trade credit for enterprises.  
Source: Banca d'Italia, *Economic Bulletin*, 32, March 2001, table 28.

the end of 1996. The average size of these funds in Italy is larger than in other European countries, reflecting the limited extent of product diversification in Italy, but this is changing as intermediaries seek to respond better to the needs of different categories of investor. Many of the new equity funds have specialized in foreign equities.

Individual portfolio management accounts have gradually spread from higher income investors to a wider customer base. The composition of portfolio management accounts has also changed as government securities have made way for a growing proportion of shares and corporate bonds. At the end of 1999 individual portfolio management accounts held 7.5 per

cent of households' financial assets, compared with 3.2 per cent at the beginning of the 1990s, although their growth slowed down in 2000. Table 6.19 shows the composition of assets in portfolio management accounts at the end of the third quarter of 2003.

Italy's asset management market has attained significant size. Investment funds directly or indirectly controlled by Italian groups account for 18 per cent of the investment fund market in Europe. Two of the five largest European groups are Italian. At the end of 1999 the Italian market had a high degree of concentration: ten groups, including two headed by insurance companies, controlled 71 per cent of total assets under management.

**Table 6.19** Funds in portfolio management services at 30 September 2003 (€m)

	Govt securities	Corporate bonds		Shares		Investment fund units		Other financial assets	Total portfolio assets
		Italian	Foreign	Italian	Foreign	Italian	Foreign		
Banks	43,962	5,775	19,375	3,689	2,884	46,725	35,563	1,331	159,309
Securities firms	4,510	929	6,001	958	696	4,294	3,323	421	21,133
Asset management companies	87,326	41,560	3,208	7,418	1,673	72,537	1,688	127	215,540
<b>Total</b>	<b>135,798</b>	<b>48,264</b>	<b>28,584</b>	<b>12,065</b>	<b>5,253</b>	<b>123,556</b>	<b>40,574</b>	<b>1,879</b>	<b>395,982</b>

Source: Banca d'Italia, *Economic Bulletin*, 38, March 2004, table a35.

The Italian life insurance industry has also been relatively underdeveloped until recent years and pension funds have been slow to develop largely because of the generous state pension provision. However, pension funds have started to grow as state pensions have come under pressure as part of the government's attempt to reduce the public sector deficit in order to qualify for membership of EMU. There are two types of pension funds – contractual funds, restricted to specific categories of worker, and open funds. The membership of contractual funds has grown significantly during the short time they have been in operation. At the end of 1999 their members numbered more than 700,000, although their assets were still only small. Open pension funds have attracted fewer members, with membership below 140,000.

The total assets of life insurance companies have also grown very rapidly in recent years and there has been a strong tendency towards the concentration of the industry, with several mergers involving foreign insurance companies. The share of households' financial assets managed by insurance companies rose to 6 per cent in the 1990s. Banks play an important role in this market. As elsewhere, ownership links have developed between banks and insurance companies, especially in the field of life insurance, and the cross-selling of products. Business combinations involving banks and insurance companies have frequently been cross-border and have given rise to some of the largest European conglomerates. In Italy, five of the ten largest life insurance companies have links with banks. In September 2000 banks owned interests in 72 Italian insurance companies, of which 34 engaged in life business and 24 in mixed business. Some smaller banks are controlled by insurance companies. The role of banks in the insurance industry is clearly revealed by their share of total life premium income, which rose from 5 per cent at the beginning of the 1990s to 50 per cent in 1999.

In Europe venture capital business has grown rapidly in the last few years. However, compared with the United States, it has focused less on investments in innovative sectors and new companies. Closed-end investment funds are very important for the financing of this activity. In Italy a decree issued by the Minister of the Treasury in July 1999 removed some of the restrictions on the maximum equity interests that could be held in each company receiving finance and made it easier for investors to enter and exit such funds. This has resulted in increased activity in this field, with

the number of funds in operation almost doubling. In 1998–99, the 63 Italian and foreign intermediaries authorized to operate in the venture capital field carried out more than 600 transactions in Italy although under 20 per cent of these were in the high-tech sectors of information technology, electronics, communications and biotechnology.

## 6.7 Summary

Until the 1970s, France could certainly be regarded as having an overdraft economy – one with a bank-based financial system. The system has also been highly centralized and regulated. Many changes have taken place in recent years although these have largely occurred as a result of deliberate decisions made by the French state rather than being a private sector response to changed financial conditions.

The changes introduced by the state were made in response to the movement towards a single European market which was opening the French financial system to competition. The result was the Banking Act, 1984, which had implications for almost all financial institutions. In 1993, as part of the preparation for a move to European Monetary Union (discussed in Chapter 22), the *Banque de France*, France's central bank, was made autonomous from government. As with Germany, however, securities markets, and particularly the market for equities, have been less important in providing corporate finance and assets for households than US and UK markets have been for their savers and borrowers. In both cases this is partly the result of the small pension fund sector, itself a product of generous state pensions financed on PAYG principles.

The Italian financial system is different again. In the past its banking system was highly segmented, its equity market small and the financial system dominated by the large market in government securities. However, the Italian system is now becoming more like those of the other leading countries. The banking system, under severe pressure to become more efficient, changed rapidly in the 1990s through mergers, takeovers and privatization. The government securities market, while still very large, has become relatively less important. The lengthening of average life expectancy, the reform of public pension systems, and more widespread familiarity with financial instruments have strengthened the preference for managed assets and



stimulated the demand for complex and sophisticated financial services. The share of equity capital in households' portfolios is increasing, as is the share of savings entrusted to specialized managers. Greater use is being made of technologically advanced channels for the distribution of financial instruments.

This study of financial structures shows us that although the current structures still show the importance of historical, political and social influences, there is a strong tendency with the development of a single European financial market for them to become more alike.

### Key concepts in this chapter

Overdraft economy  
Mutual and cooperative banks  
Savings banks  
SICAVs

Fonds commun de placement  
Market capitalization  
Debt ratio  
Return on equity

### Questions and problems

- 1 Explain what is meant by an 'overdraft' economy.
- 2 Distinguish between the functions of the *Comité des Etablissements de Crédit*, the *Comité de Réglementation Bancaire* and the *Commission Bancaire*.
- 3 Give three examples of steps taken to stimulate the development of securities markets in France in recent years.
- 4 Why have French governments taken these steps?
- 5 Why was the Italian banking system segmented and uncompetitive until the 1990s?
- 6 What has been done during the 1990s to increase the relative profitability of Italian banks?
- 7 Why has the market for government securities been the dominant financial market in Italy until recent years?
- 8 In what ways and for what reasons is the Italian financial system becoming more similar to the financial systems of other developed countries?

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Chapter 7

# Financial systems in Northern Europe

Hans-Michael Trautwein

*What you will learn in this chapter:*

- The main features of the banking systems in Nordic countries
- The main features of Nordic non-deposit-taking institutions
- The origins of Nordic banking crises in the 1980s and 1990s
- Current trends towards concentration and integration
- The differences and similarities in approach to monetary policy among Northern European countries

## 7.1 Introduction

The Nordic countries – Denmark, Norway, Sweden and Finland<sup>1</sup> – are small economies in comparison with the countries whose financial systems have been described in previous chapters. Yet the institutions of money, banking and finance in these Northern European countries are of general interest because of their history and because of the current interaction between structural changes in the financial systems and the diversity of monetary policy frameworks in the region. Moreover, the four countries enjoy a relatively high degree of cultural homogeneity, and if their financial institutions continue to merge and cooperate at their current pace, the region – with its 24 million inhabitants and a total GDP that matches that of Spain plus Portugal – will soon have an integrated financial market that ranks among the 10 largest in the world.

The Bank of Sweden, *Sveriges Riksbank*, is the oldest existing central bank in the world. Its history as a public institution dates back to 1668, when it succeeded the world's oldest note-issuing bank, *Stockholm Banco* (also known as *Palmstruchska Banken*). Under the auspices of the parliament, the *Riksbank* (or, as it was called then, *Riksens Ständers Bank*) was actually in operation long before private banks started to do business in the mid-nineteenth century, when the state began to promote private banking in order to develop Sweden's industries and commerce.

The Danish central bank, *Danmarks Nationalbank*, is somewhat younger, but its history is remarkable for its shifts between public and private ownership. The institution was founded as a private bank in 1736 and, due to insolvency, transformed into a state bank in 1773. Some interesting changes took place in the second decade of the nineteenth century – a period that also saw the foundation of the Bank of Finland, *Suomen Pankki* (in 1811), and the Bank of Norway, *Norges Bank* (in 1816). As Denmark's finances were ruined by the Napoleonic wars, the old state bank was declared bankrupt in 1813 and first replaced by a new state bank, the *Rigsbank*. Since it had no gold or silver reserves, the *Rigsbank* supported its issue

of bank notes by a rent charge on all real estate in Denmark.<sup>2</sup> In 1818, the state bank was transformed into the privately owned *Nationalbank*, as the large property holders received shares in the bank in exchange for the rent charge. This privatization of the central monetary institution was reversed in 1936, when the *Nationalbank* was proclaimed to be a 'self-owning' public institution and the government and parliament were given greater insight into its affairs.

As in Sweden, systems of commercial banks or other private banks emerged in Denmark, Norway and Finland only some time after the central banks had been established. The evolution of banking in Scandinavia thus followed a 'top-down approach' – in contrast to continental Europe and Britain, where commercial banking had developed long before its cyclical instability prompted governments to bring the monetary system under the control of central banks.

Even though its commercial banks were latecomers, Sweden has come to be an extreme case of a bank-dominated economy (see Section 2.2). By the mid-1980s, the two biggest commercial banks held 'strategic shares' in most of the major non-financial companies, of which a large number was ranked among the top 1,000 multinationals in the world. The (mostly social-democratic) Swedish governments supported this concentration of capital and power as it helped them to centralize economic decisions and to carry out their export-oriented growth strategy. In the other three Scandinavian economies, small and medium-sized companies remained economically and politically predominant, with the exception of the one or two big conglomerates. In all four countries, the financial systems were nevertheless dominated by relatively large domestic banks that were protected from the competition of foreign banks, but at the same time subject to extensive regulation and exchange controls.

This changed in the mid-1980s when a wave of deregulatory measures eliminated credit and interest restrictions, at the same time as Northern Europe was opened for cross-border capital flows. New markets were set up for a broad range of financial assets. The opening of the markets created a credit boom, a rise in inflation rates, and speculative bubbles in property

<sup>1</sup> In the following, the terms 'Nordic countries', 'Scandinavia' and 'Northern Europe' are used interchangeably to describe these four countries. Iceland, the fifth member of the Nordic council, is not included in this chapter because of the relatively small size and importance of its financial system.

<sup>2</sup> This trick may have set the example for the well-known Rentenmark that the German *Reichsbank* introduced to eliminate hyperinflation in 1923; see also Chapter 5 and Goodhart (1988), p. 129.

**Table 7.1** Scandinavian diversity of frameworks for monetary policy

Status quo in April 2004		EU membership	
		yes	no
exchange rate regime	currency union (EMU)	Finland	
	fixed € exchange rate	Denmark	
	floating exchange rates	Sweden	
	floating exchange rates		Norway

and equity markets that were supported by huge capital inflows. However, most of the export markets of the Scandinavian industries went into a recession around 1990, while the German *Bundesbank* began to fight the inflationary impulses of the exceptional reunification boom in Germany (see Chapters 5 and 22). As a result, real interest rates in Scandinavia quickly rose to unprecedented levels. The speculative bubbles burst and produced a wave of bankruptcies, which led to a deep recession and severe banking crises in Sweden, Norway and Finland (and milder problems in Denmark) in the early 1990s. These crises were overcome within a few years, but the landscape had changed very much by the turn of the century. The financial sector in Scandinavia has been transformed by a series of domestic and cross-border mergers and acquisitions, in which some big domestic banks and insurance companies evolved into large financial groupings.

Moreover, the four countries are currently characterized by a great diversity of exchange rate and monetary policy regimes, which is illustrated by Table 7.1. Finland, Sweden and Denmark are members of the European Union (EU), while Norway is not. Finland is a founding member of the European Monetary Union (EMU), whereas Denmark and Sweden have opted out – at least for the time being. Denmark has pegged the exchange rate of its currency to the euro (€), whereas Sweden and Norway leave their exchange rates floating.

This diversity, which largely developed after the crisis of the European Monetary System in 1992, may to some extent be explained by policy responses to the deregulatory transformation of the financial systems and, in particular, to the deep recession and the banking crises. As such it may be a transitory phenomenon. It is, on the other hand, an issue open for discussion in how far the respective choices of the exchange rate regime have affected the structures of the financial systems in Scandinavia.

In the rest of this chapter, we shall take a look at the banking systems in the Nordic countries (in Section 7.2), at other financial intermediaries (in Section 7.3), at the domestic and cross-border integration of the financial systems (in Section 7.4), and finally at the diversity of monetary policy strategies in these countries (in Section 7.5). The discussion is largely centred on the Swedish system, both because Sweden is the biggest economy in the region and because the evolution and present state of its financial system is particularly well documented. With Sweden as the benchmark case, the description of the other three systems will mostly be confined to their relevant peculiarities. The last two sections, however, will concentrate on the convergence of financial institutions and the divergence of the monetary policies in the region.

## 7.2 Banking systems in the Nordic countries

This section contains a short introduction to the structures of the Scandinavian banking systems. The presentation is arranged country by country, setting the focus on the main players in the national arenas. Each subsection provides a brief account of the tasks, organizational features and main instruments of the central bank, followed by a description of the market structure in the banking sector in the respective country.

### 7.2.1 Sweden

*Sveriges Riksbank*, the Bank of Sweden, is the oldest existing central bank in the world. Yet it was only in 1999 that a new law gave the *Riksbank* full independence in its operations to keep the value of money stable

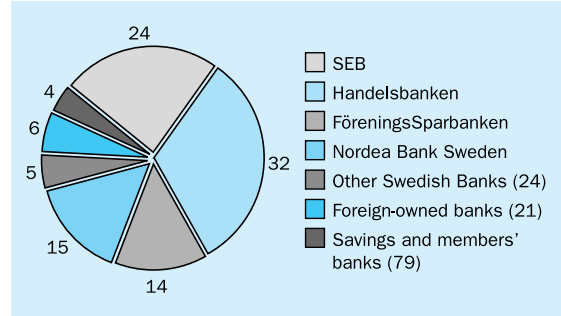
(see Section 7.5). In addition to its responsibility for monetary policy, the *Riksbank* also has the tasks of promoting a secure and efficient system of payments and safeguarding the stability of the financial system as a whole, while the responsibility for the soundness of individual financial institutions rests with the Financial Supervisory Authority (*Finansinspektionen*).

The *Riksbank* is managed by an executive board of six full-time members, who are appointed by the general council for six-year terms. The executive board makes all monetary policy decisions, and its members are forbidden to seek or take instructions from the government or any other institution. For transparency, the minutes of the meetings of the executive board are published very shortly afterwards. Apart from selecting the members of the executive board, the general council has a controlling function; its 11 members are recruited from the ranks of the members of parliament.

In its conduct of monetary policy, the *Riksbank* aims at controlling the market level of short-term interest rates. The main instrument used for this purpose is the ‘repo rate’, the interest rate on the weekly repurchase agreements by which the banks borrow from and deposit money in the central bank. By raising the repo rate, the *Riksbank* signals its intent to curb inflationary expectations. By lowering the repo rate, it signals its willingness to support an expansion of lending and investment.

Sweden has, like Germany, a tradition of universal banking. Most Swedish banks offer a comprehensive range of services in retail, wholesale and investment banking. The most remarkable feature of the Swedish banking system is the dominant position of four big banks, which account for about 85 per cent of the balance sheet totals of all 128 banks in the country (see Figure 7.1). Two of the Big Four, SEB and *Handelsbanken*, are old commercial banks with a long tradition of ownership and close management ties with industrial companies. The other two, *Nordbanken* and *FöreningsSparbanken*, are newcomers with old roots in other segments of the banking business.

The SEB (*Skandinaviska Enskilda Banken*) is the base of the Wallenberg dynasty, a family that has presided over Scandinavia’s biggest industrial empire for most of the twentieth century and continues to exert



**Figure 7.1** Banks' balance sheet totals in Sweden, end 2002 (shares in per cent of total of all 128 banks: SEK 3,277 billion)

Source: Sveriges Riksbank, *Den svenska finansmarknaden 2003*, July 2003, pp. 36–38.

its influence over a large sphere of companies by way of foundations, strategic shareholding and directorates – not to speak of the bread-and-butter business of bank lending.<sup>3</sup> A list of the major companies under the influence of the Wallenbergs reads like the *Who's Who* of Swedish multinationals: ABB (formerly ASEA), Alfa Laval, Astra, Atlas Copco, Electrolux, Ericsson, SAS, Scania, SKF, Swedish Match, and many others. *Handelsbanken*, the other old commercial bank, shows a bigger balance sheet total than SEB in Figure 7.1, but its sphere of influence in the non-financial sector is not quite as large. *Nordea Bank Sweden*, formerly *Nordbanken*, emerged as a half-privatized company from the state-owned postal bank in the mid-1980s, when Swedish credit markets were deregulated. In the general race for market shares that followed the opening of the markets, *Nordbanken* increased its corporate lending aggressively. Between 1990 and 1992 it suffered such great credit losses that the government had to acquire all privately owned shares and restore the capital base. In the mid-1990s *Nordbanken* was partly privatized again; since then it has expanded rapidly in the Scandinavian banking markets and changed into *Nordea*, a large trans-Nordic financial services group and one of the first Nordic companies to be registered under the legal form of ‘Societas Europaeae’ (see Section 7.4). *FöreningsSparbanken* was founded in 1997, when *Föreningsbanken*, the central institution of the

<sup>3</sup> Until recently, Swedish law permitted the issue of shares with very large differences in voting rights. The Wallenbergs have thus been able to secure control positions with relatively small shares of capital. In the mid-1980s, it was estimated that their voting rights exceeded their shares of capital by a ratio of 100:1. Some differences in voting rights are still tolerated, even though they are not in accordance with European Union legislation.

agricultural credit unions, merged with *Sparbanken*, the largest of the savings banks. *Sparbanken* was itself a product of mergers of a number of savings banks, some of which had also been in great trouble during the banking crisis of the early 1990s.

Traditionally, SEB and *Handelsbanken* have dominated the market segments of wholesale and investment banking, whereas *Nordbanken* and *FöreningsSparbanken* have held stronger positions in retail banking. The restructuring of Scandinavian banking has greatly diminished these differences (see Section 7.4).

## 7.2.2 Denmark

*Danmarks Nationalbank*, the Bank of Denmark, has enjoyed independence from the government since 1936, but it is not autonomous in its conduct of monetary policy. Denmark has pursued a fixed exchange rate policy vis-à-vis the Deutschmark since 1982 and the euro since 1999. Until 1998, its policy measures were designed to shadow the movements of the German currency, and since the start of the European Monetary Union they have to match the policy of the European Central Bank (see Section 7.5). Like other central banks, the *Nationalbank* is also a banker to the banks and to the government. The responsibility for the stability of the financial sector is divided between the *Nationalbank*, as the guardian of the system, and a separate supervisory authority (*Finanstilsynet*) that monitors the soundness of individual financial institutions.

The *Nationalbank* is managed by a board of three governors, who are appointed by the board of directors for unlimited tenure. The board of directors has 25 members, out of whom eight are elected by the parliament, two are appointed by the Minister of Economic Affairs and the other 15 members are elected by the board of directors with a view to involving the business community. A seven-member committee of directors provides a link between the board of governors and the board of directors, without a strict definition of its tasks. The power to decide about the formulation and measures of monetary policy – which, however, have to conform to the exchange rate target – rests entirely with the board of governors. In its conduct of monetary policy, the *Nationalbank* mainly relies on repurchase agreements, as in the Swedish case, but it still uses the discount rate for signalling its assessment of the market conditions.

The Danish market for banking services is nearly as concentrated as its Swedish counterpart, even though it is characterized by a relatively large number of small banks. In 1999, the five largest banks accounted for 81 per cent of the balance sheet totals of all 181 banks in the country (Danmarks Nationalbank, *Financial Statistics* 2003, p. 21). The market shares of the biggest two, *Danske Bank* and *Nordea Denmark* (formerly *Unidanmark*), were 39 and 25 per cent respectively. Traditionally, mortgage institutions have been strong in the Danish financial sector. In recent years, the biggest banks and mortgage institutions have been penetrating each others' markets. These trends will be discussed in later sections.

## 7.2.3 Norway

In most international rankings, *Norges Bank*, the Bank of Norway, has for a long time been considered to be among the least independent banks (Bank for International Settlements, 1997, p. 128). The political authorities, i.e., the government and the parliament, still have a greater influence on the formulation of the guidelines for monetary policy than elsewhere. But since 2001, *Norges Bank* has been more independent in pursuing the prescribed target of maintaining inflation in the range of 2.5 per cent (see Section 7.5). In Norway, too, the tasks of supervising the financial system are divided between the central bank and a separate authority (*Kreditilsynet*). In addition to the usual activities of central banks, *Norges Bank* manages the Government Petroleum Fund in which a large portion of Norway's revenues from oil and gas production is saved and invested in foreign equities and bonds.

*Norges Bank* is managed by an executive board whose seven members are all appointed by the King; employees have two members who supplement the executive board when it deals with administrative matters. A supervisory council of 15 members, all elected by the parliament, is responsible for ensuring that the rules and guidelines for the bank's activities are observed. In its conduct of monetary policy, *Norges Bank* – like most central banks in Europe – has come to rely on repurchase agreements as the main instrument for the liquidity supply. However, as the Norwegian banks tend to have a structural surplus position vis-à-vis the central bank, the sight deposit rate is considered to be the key rate. Furthermore, *Norges Bank* intervenes frequently in the market, because the government's

working account is in the bank. The liquidity position of banks is thus subject to rapid changes, which make it necessary to supply or withdraw liquidity at irregular and short intervals.

The Norwegian banking sector is characterized by a relatively strong position of savings and union banks. While the clear division between this segment and the commercial banks has largely vanished in the other Scandinavian countries, it is still perceptible in Norway. Out of the 161 banks supervised by *Kredittilsynet* in the year 2003, 129 were savings and union banks, mostly small institutes of local character (*Kredittilsynet, Årsmeldinger/Annual Reports 2000–03*). The segment is dominated by the SpareBank 1 group, with a market share of 15 per cent in the whole banking market. After the acquisition of the Union Bank of Norway in 2003, *Den norske Bank* (DnB) is now by far the biggest commercial bank in the country, with a market share of 40 per cent. The third big bank is *Nordea Norway*, the former K-Bank (*Christiania Bank og Kredittkasse*), with a market share of approximately 18 per cent. DnB and K-Bank suffered heavy losses in the banking crisis of the early 1990s and had to be rescued by government funding. They recovered quickly, but the majority of their shares remained in the hands of the government funds – at least until 2000, when K-Bank was sold off to *Nordea* (see Section 7.4). The big banks in Norway are comparatively small by Scandinavian standards.

### 7.2.4 Finland

Finland is one of the 11 founding members of the European Monetary Union. *Suomen Pankki*, the Bank of Finland, is thus a member of the Eurosystem, the core group of the European System of Central Banks. It participates in the implementation of the Eurosystem's single monetary policy which is conducted by the European Central Bank at Frankfurt (see Chapter 23). Banks and other financial institutions in Finland are supervised by 'Financial Supervision' (*Rahoitustarkastus*), which is located at the Bank of Finland, but operates as a legally independent authority.

Among the Nordic countries, Finland has the largest number of banks and, at the same time, the highest degree of concentration in the banking sector. At the end of 2002, a total of 344 banks were operating in the country (*Suomen Pankkiyhdistys, 2003, pp. 9–14*). Most of them were small savings banks and local union banks. The three biggest banks accounted for

90 per cent of the balance sheet total of all Finnish banks. The smallest among the Big Three was *Sampo* with a market share of 7 per cent. The OP Bank Group, a consortium of 243 union banks, had a market share of 9 per cent. Roughly three-quarters of the Finnish banking market is made up by *Nordea Finland*, formerly known as *Merita*. Like various other big banks in Scandinavia, *Merita* was an indirect product of the banking crisis of the early 1990s. It was created by a merger of the two largest commercial banks in the mid-1990s, after extensive rescue operations by the government and the central bank.

#### More from the web The Nordic central banks

Like most other central banks, the central banks in Sweden, Finland, Denmark and Norway have websites which publish a large amount of very topical information. As in other countries there are also helpful websites maintained by professional bodies representing various groups of financial intermediaries. The following are some examples.

The Danish Bankers' Association has a website at [www.finansraadet.dk](http://www.finansraadet.dk). Clicking on 'Facts' and then on the 'Danish Banking System' produces a wealth of information on the Danish financial system, including securities markets and trading arrangements.

The Swedish Central Bank's homepage gives access to information on monetary policy, market operations and publications. The latter include minutes of its monetary policy committee and the equivalent of an 'inflation report'. The website is at [www.riksbank.com](http://www.riksbank.com). 'Statistics Sweden' at [www.scb.se](http://www.scb.se) is Sweden's official statistics database containing statistics about the financial system and also about the Swedish economy.

The Norwegian Central Bank has a website at [www.norges-bank.no](http://www.norges-bank.no), which has a lot of information stored under 'publications' on its homepage.

The Danish Central Bank website, [www.nationalbanken.dk](http://www.nationalbanken.dk), has sections on monetary policy, publications and statistics. There is also a very detailed explanation of the Danim payments system, accessible from the homepage.

The Finnish Central Banks has a website at [www.bof.fi](http://www.bof.fi) with range of publications and a statistical database, but probably more useful is the Finnish Bankers' Association website, which has separate sections for banks, other financial intermediaries and financial markets. The website is at [www.pankkiyhdistys.fi](http://www.pankkiyhdistys.fi).



### 7.3 Other financial intermediaries in the Nordic countries

In Section 7.2 we looked at the Scandinavian systems of central banks and deposit banks, whose core business is to provide payment services and to make loans and hold deposits. In this section, we will take a brief look at other market segments of financial services in the Nordic countries. The firms that operate in those segments are mortgage institutions, other special credit institutions (including state lending institutions), investment companies, mutual funds, insurance corporations and pension funds. Most of these institutions do not, in their activities, differ very much from their British or German counterparts, which have been described in greater detail in Chapters 3 and 5. Furthermore, nearly all private non-bank intermediaries in Scandinavia are closely connected with, or direct subsidiaries of domestic banks. This integrative ‘all-finance’ or ‘bancassurance’ approach of Scandinavian banks will be assessed in the next section. In this section, the discussion is confined to two issues: the role of non-bank intermediaries in lending to the non-financial sector and in financial asset holdings of households, and the role of pension funds. It is convenient to organize that discussion issue by issue, rather than country by country.

#### 7.3.1 Structures of lending and asset holding

Table 7.2 gives a quantitative impression of the structure of financial intermediation in Sweden. In terms

of the balance sheet total, the biggest institutional segment is clearly the banking sector, followed by mortgage institutions and insurance companies. In a system of universal banking, the banks’ aggregate portfolio is naturally more diversified than the portfolios of the other, more specialized groups of institutions. That implies that the banks, despite their dominant position, are not necessarily the biggest lenders in credit markets or investors in bond and equity markets. Mortgage institutions account for a greater volume of direct lending to the non-financial sector, while insurance companies and pension funds hold more bonds and shares than the banks.

The prominent role of mortgage institutions reflects the high degree of owner-occupied housing in Sweden. Real property constitutes the greatest item among households’ net assets in the whole of Scandinavia. Yet the systems of finance for housing differ a lot between the countries. In Denmark, special institutions have traditionally played a far greater role in this market than banks (see Table 7.3). Mortgage institutions lend roughly the same amount in Denmark and in Sweden, but the Danish population is only 60 per cent of its Swedish counterpart. In contrast, the segment of mortgage banking is much smaller in Norway and smallest in Finland where housing is largely financed by way of bank loans. These differences are largely due to two factors. Mortgage banking has enjoyed greater privileges and subsidies in Denmark than in Norway and Finland. In addition, the bond markets of the two northernmost Scandinavian countries were, for a long time, far too small to provide the means for refinancing mortgage loans. In Denmark, on the other hand,

**Table 7.2** Balance sheet totals and assets of financial institutions in Sweden, end 2002 (SEK bn)

	Balance sheet total	Lending to the public	Other lending	Interest-bearing securities	Equities	Other assets
Banks	3,277	1,360	901	469	145	403
Mortgage institutions	1,265	1,188	53	3	7	14
Other credit institutions	472	334	21	91	3	23
Insurance companies	1,612	43	10	858	589	112
National Pension Fund	488	–	–	195	281	12
Fund management companies	703	–	–	205	343	155
Securities companies	44	5	8	1	8	22
<b>Total</b>	<b>7,861</b>	<b>2,930</b>	<b>993</b>	<b>1,822</b>	<b>1,376</b>	<b>740</b>

Source: Sveriges Riksbank, *Den svenska finansmarknaden 2003*, p. 65.

**Table 7.3** Banks, mortgage institutions and insurance corporations\* (in % of balance sheet totals)

	Sweden (2002)	Denmark (2001)	Norway (2003)	Finland (2002)
Banks	42	37	64	60
Mortgage institutions	16	31	12	1
Insurance companies	21	20	21	28

\*Excluding public pension funds.  
Sources: Sveriges Riksbank, *The Swedish Financial Market 2003* (2003, p. 65); Finansrådet, *The Danish Banking System 2002/03* (2003, p. 4); Norges Bank, *Economic Bulletin* (2003, p. 45); Suomen Pankkiyhdistys, *Finnish Financial Markets* (2003, p. 5).

mortgage institutions often intermediate between bond markets and firms in the sense that many companies prefer to borrow from them rather than financing their investments through direct bond issues.

The differences in housing finance are of some importance for the transmission of monetary policy: the longer the periods of fixed interest in loan contracts, the lower is the immediate impact of changes in the central bank's lending rate on consumer spending and on overall economic activity. The financial structure in Denmark is dominated by long-term borrowing at fixed rates via mortgage institutions, whereas lending and borrowing at floating (or short-term adjustable) interest rates is very common in Norway and Finland; in Sweden, the share of fixed interest contracts is about 50 per cent, but the average duration of fixed interest periods has varied frequently and conversely with the market level of interest rates in recent years (Bank for International Settlements, 1997 and Sveriges Riksbank, 1999, p. 31). These differences in financial structures lead to the prediction that monetary policy in Denmark

works less directly and with longer lags than equivalent measures in Sweden, Norway and Finland.

The liabilities of the financial sector are to a large extent financial assets of the household sector. If we look at the portfolio structures in Table 7.4, we can see further significant differences between the national systems of financial intermediation. In recent international surveys, Sweden has frequently been ranked as the country with the world's highest ratios of households' shareholding and of shareholders among the population (Deutsches Aktieninstitut, *DAI-Factbook 2000*, p. 8.6-1). Table 7.4 also shows that direct and indirect shareholding (fund shares) accounted for half of households' financial wealth in Sweden before the 'dotcom' bubble burst in 2000. This seems to contradict our earlier observation that the Swedish economy is dominated by a few big banks. Yet it should be noted that the wide distribution of shares has been supported by various political measures in reaction to debates about the concentration of capital and power in the country, and that considerable differences between the

**Table 7.4** Financial assets of households (%)

	Sweden		Denmark		Norway		Finland	
	1999	2003	1999	2003	1999	2003	1999	2003
Bank deposits	16	19	29	29	32	35	36	35
Insurance claims	24	31	44	43	34	34	15	23
Fund shares	24	19	6	9	7	5	3	4
Bonds	5	3	13	8	n.a.	2	1	1
Equities	26	19	6	7	14	11	43	33
Other	6	9	2	4	13	13	2	4

Sources: Sveriges Riksbank, *The Swedish Financial Market 2003* (2003, p. 26); SCB, *Statistics Sweden* (2004); Danmarks Nationalbank, *Financial Statistics* (2004, p. 37); Kredittilsynet, *Armelding* (2000, p. 6); Norges Bank, *Financial Stability 2/03* (2003, p. 18); Statistics Finland, *Financial Accounts* (2004).

voting rates of shares (of the same denomination) still exist. A large fraction of the investment funds, through which Swedish households indirectly hold shares, are subsidiaries of domestic banks. This gives the banks another channel of influence on the decision making of the fund managers. It should also be noted that the high proportion of equity in the financial wealth of Swedish households in 1999 followed to some extent from a price effect, since the values of shares were extraordinarily high then. The price effect also accounts for the lower ratios of shareholding in 2003.

Finland even tops Sweden in terms of direct shareholding, but the relatively high share of bank deposits suggests a higher degree of risk aversion and a price effect in the valuation of Finnish shares following the extraordinary boom in the Finnish equity markets in the late 1990s. In Denmark and Norway, by far the largest part of financial assets is held in the form of bank deposits and insurance claims.

The differences in shareholding could lead to differences in the transmission of monetary policy between the Nordic countries, since share values are quite sensitive to changes in the market level of interest rates and value gains and losses frequently have a wealth effect on borrowing and consumer spending. We will take a further look at these issues in Section 7.5.

### 7.3.2 Pension funds

All the pension systems in Northern Europe rest on three pillars: a general public pension, supplementary occupational pension schemes, and individual private pension saving. The first pillar has often been regarded as the main element of ‘the Scandinavian model’, a pension system that follows the principle that all citizens have the right to the same pension. This public pension is independent of previous contributions and it is paid from general tax revenues. However, what was meant to be an equal pension for all has become a minimum pension over the last three decades. The second pillar has therefore enormously gained in importance in all four countries, where mandatory schemes have developed along with voluntary schemes at trade union and firm levels. The supplementary pensions in the mandatory schemes depend on previous

contributions from payroll taxes and on the salary incomes of the last working years before retirement. These schemes are (at least partially) prefunded in the sense that the contributions of the wage earners are paid into National Pension Funds which invest the money in the financial markets – with the exception of Finland, where the pension funds are managed by private insurance companies.<sup>4</sup>

The National Pension Funds are large investors in the financial markets. The Swedish AP-fonden and its Danish counterpart ATP account for 6 per cent of the balance sheet totals of financial institutions in their countries, respectively (see also Table 7.2). No separate figures were available for Norway and Finland, but it should be noted that one of the objectives of the Norwegian Government Petroleum Fund (Section 7.2.3) is ‘to meet the financial challenge of paying for an ageing population’. The balance sheet total of the Petroleum Fund corresponds to one-tenth of the total of all other financial institutions.

In addition to the occupational pension schemes, a number of other pension funds exist in all four countries. So far, they play only a minor role in the capital markets and for pensioners’ incomes.

## 7.4 The evolution and integration of financial systems in Scandinavia

In the following we shall take a look at past problems and present trends in financial institutions and markets in the Nordic countries. The first subsection provides a brief account of the development of financial markets and the ensuing banking crises in the 1980s and 1990s. The second subsection describes the ongoing process of concentration in the Nordic financial sector.

### 7.4.1 Market expansion and banking crises

Before the 1980s one could hardly speak of financial markets in Scandinavia, at least not in terms of transaction volumes in the money, bond or equity markets. The financial systems in all four countries were clearly

<sup>4</sup> Since 2000, Swedish wage earners also have the option to place a part of their contributions to the supplementary pension scheme in mutual funds that are administered by independent companies.

centred on bank lending, strictly segmented<sup>5</sup> and regulated by interest and credit ceilings, portfolio restrictions and exchange controls. Apart from small interbank markets, there were no money markets. Bond markets were largely confined to primary markets for issues of the governments and the mortgage institutions, and investors were almost exclusively domestic insurance companies and pension funds, which were legally obliged to hold certain shares of government bonds in their portfolios. The equity markets were quiet places, too, as the open trading of shares was rather marginal; most of the shares were continuously held for purposes of strategic control or as long-term investments in fund portfolios.

As in many other countries, this changed with financial market deregulation and integration in the 1980s. Many Scandinavian companies had begun to circumvent the exchange controls or to use 'grey' credit markets, when prices, interest rates and exchange rates became increasingly volatile in the 1970s. As the governments and central banks noticed that quantitative regulation no longer ensured control of activities in the financial sector, they abolished controls over banks' lending volumes and interest rates at the same time as they created open money markets and bond markets as arenas for their use of interest rate policy. And they dismantled other portfolio restrictions and exchange controls, so that equity markets became increasingly attractive.

Deregulation did not come everywhere at the same time. In Denmark, the process had already started around 1975, since the country had joined the European Economic Community (EEC, now the European Union) and had to adjust to EEC rules and regulations. In Sweden and Norway, the biggest changes came with the creation of fully-fledged money and bond markets in the early 1980s, whereas in Finland functioning secondary markets for bonds and equities appeared only at the beginning of the 1990s (Oxelheim, 1996, Ch. 15).

The years around 1985 nevertheless mark a period of extraordinary credit expansion in all four countries, which clearly had its root in the deregulation of the financial sectors. Unfettered competition in the loan markets led to a sharp increase in bank lending to

investments in commercial and residential property as well as equity. As a consequence, a debt–asset price cycle developed that interacted with accelerating inflation. Competition kept nominal interest rates at a low level, and real interest rates were even lower due to inflation. Borrowed funds helped to fuel the rise in asset prices which, in turn, helped to increase the borrowing capacity of firms and households. And the banks pushed on in their race for market shares and profits. Between 1982 and 1989, house prices in Sweden rose by 50 per cent, commercial property prices by almost 200 per cent, and equity prices by almost 400 per cent (OECD, 1994, Annex III). Similar developments took place in Norway and Finland. In Denmark, the asset price inflation was considerably lower, since the market expansion was both stretched over a longer time and more restricted by the relatively high interest rates that *Danmarks Nationalbank* had to set in order to meet its exchange rate targets within the European Monetary System.

The debt–asset price cycles of Sweden, Norway and Finland proved to be unsustainable when real interest rates surged to unprecedented levels around 1990. A worldwide recession, the breakdown of (trade with) the Soviet Union and the weakened confidence in the (then) fixed exchange rates led the central banks of the three countries to pursue strongly disinflationary policies. The speculative bubbles in the property and equity markets burst and produced heavy credit losses, which brought many of the largest banks of Scandinavia to the verge of collapse – and with them the whole of the financial systems.

Sweden, Norway and Finland thus experienced severe banking crises that quickly proved to be too strong for ordinary 'lending of last resort' by the central banks.<sup>6</sup> The central governments had to intervene, but the type and costs of their rescue operations differed considerably between the three countries (see Table 7.5). In Norway and Finland, the rescue operations were largely carried out with resources from the central banks and government funds, whereas in Sweden the central government alone has been involved. The Swedish solution of the problem was quite spectacular and much debated. Between autumn 1992 and the end of 1993, the central government

<sup>5</sup> Separate systems of regulation applied to commercial banks, savings banks, union banks, mortgage-credit institutes, insurance companies and mutual funds.

<sup>6</sup> In Norway, the wave of credit losses had actually started as early as 1988, but there was little recognition that a banking crisis had occurred before similar problems made themselves more strongly felt in Sweden and Finland in 1991; see Reve (1996).

**Table 7.5** Assets of major banks and costs of rescue operations in the banking sector (% as a share of GDP 1992)

	Assets of five largest banks	Assets rescued	Costs of rescue operations
Sweden	121.0	31.0	
<i>central government</i>			5.2
Finland	102.0	16.0	
<i>central government</i>			1.7
<i>government funds</i>			3.0
<i>central bank</i>			2.7
total			7.4
Norway	69.0	46.0	
<i>central government</i>			2.8
<i>government funds</i>			0.1
<i>central bank</i>			0.1
total			3.0

Source: OECD: Sweden Volume Economic Surveys, 1994, Issue 3 (OECD, 1994), tables A5 and A6.

provided unlimited state guarantees for all commitments of banking institutions toward creditors and depositors. Prior to this, the government had injected large funds into the three banks whose equity capital was wiped out by the credit losses. *Nordbanken*, which had been a state-majority-owned bank, and Gota Bank were completely taken over by the state and stripped of their bigger problem assets which were transferred into two newly created, state-owned ‘bad banks’, *Securum* and *Retriva*.<sup>7</sup> Even all the other big banks seized the chance to recycle their bad assets through such tax-and-cost-saving special institutions.

The immediate costs of these rescue operations were considerable, about 5 per cent of 1992’s GDP in Sweden (see Table 7.5). Since they had to be borne by the taxpayer and since the banks’ shareholders were treated rather generously, there was some debate about ‘moral hazard’ problems. Moreover, it was argued that the bail-out through state guarantees and bad banks tends to undermine incentives to cost-efficiency in the banking business and that it has placed the more prudent banks at a competitive disadvantage. Ten years after the outbreak, the total costs of the Swedish

banking crisis are still hotly debated. Technically, the handling of the problem assets has been quite successful. When *Securum*, the biggest bad bank, was liquidated in 1997, a large share of the problem assets and institutions were sold off at reasonable prices, so that it was estimated that nearly half of the state’s immediate costs of the rescue operations had been retrieved. Yet the bad banks themselves were accused of liquidating too many companies and jobs on their way. It is nevertheless fairly safe to conclude that the total costs of the banking crisis would have been much higher for the Swedish economy if the state had not bailed out the banks.

#### 7.4.2 Concentration in the Nordic financial sector

We have seen in Section 7.2 that the banking sectors are highly concentrated in all Scandinavian countries. By 1998, the five largest banks in each Nordic country accounted on average for 86 per cent of the total balance sheet of the Nordic banking sector, while the

<sup>7</sup> ‘Bad banks’ are special institutions whose task is to save ‘good banks’ by buying some of the latter’s problem assets (mostly non-performing loans), presumably at low prices. The ‘good banks’ are then allowed to write off the losses and save taxes and further costs. The ‘bad banks’ reschedule the loans, restructure the borrowers’ business or sell off the collateral, usually within the framework of special regulations and a predefined period. In the 1990s, the Swedish strategy of ‘bad banking’ achieved model character for the restructuring of crisis-stricken banking sectors in other countries; see Hawkins and Turner (1999).

equivalent average for the EU member states was 64 per cent (Danmarks Nationalbank, *Monetary Review* 2/2000, p. 69).<sup>8</sup> The degrees of concentration have been relatively high for a long time. They are, as such, a rather common phenomenon in small countries, reflecting the existence of economies of scale and scope in the banking business which imply that banks need to be of a certain size in order to work efficiently. But the concentration process has been intensified in recent years; and it has taken the Nordic financial sectors several steps closer towards the domestic integration of different segments and towards their **cross-border integration**. This process is, to a large extent, a by-product of the banking crises, because they created an atmosphere in which the consolidation of the banking sector was given strong priority – especially in view of the ongoing integration process on the level of the European Union.

Close to collapse as the Swedish banks were in 1992, they quickly recovered in the following years, with some appetite for expansion in and beyond the Nordic region. In 1993, Nordbanken bought *Gota Bank*, the other problem bank. What first looked like a club of losers became the core of Nordea, the biggest financial services group in Scandinavia, whose total assets (€262bn in early 2004) are in the range of Sweden's GDP. Nordbanken merged with the Finnish Merita Bank and their joint holding, *Merita Nordbanken*, began to acquire other large banks as well as mortgage institutions and insurance companies in all the Nordic countries. The history of *Nordea* is the perfect example of cross-border and cross-segment integration of financial activities in the region.

Other banks have expanded in similar ways, though on a smaller scale. Nearly all of the large new holdings have set up subsidiaries in the Baltic countries and some, like the Swedish SEB, have even started to acquire larger banks on the Continent. Some banks, like the Swedish *FöreningsSparbanken*, have chosen to forge strategic alliances with banks in other countries that have a similar background in savings and union banking.

This wave of mergers, acquisitions and alliances is not a specific characteristic of the Nordic financial sector. As financial institutions prepared for intensified competition in the European financial market, these

things have happened everywhere. Yet it is remarkable that the concentration has almost exclusively been an intra-Nordic affair. Financial institutions from countries outside Scandinavia have so far had little success in penetrating the markets in the Nordic countries (Engwall *et al.*, 2001).

Two other characteristic features of the ongoing concentration process are the strategies of all-finance and electronic banking. The term 'all-finance' describes cross-segment integration, that is, a tendency of financial groups, like Nordea, to offer the full range of banking and financial services under one brand, including insurance and pension fund management. In addition, Scandinavian banks do currently have a lead in the technologies of electronic banking. What is normally regarded as a disadvantage of the Nordic countries, namely their low population density, has turned out to be an advantage in the diffusion of new techniques. The costs of setting up bricks-and-mortar branches of financial institutions are particularly high in sparsely populated countries. This gives the financial services groups extra incentives to exploit the economies of scope from all-finance and the economies of scale from electronic banking. Technical progress and the concentration process interact, since profits from electronic banking tend to grow with network size, and mergers and acquisitions enlarge the networks.

The emergence of transnational financial groups increases the need for cooperation between the supervisory authorities of the countries involved. The supervisory authorities of the Nordic countries have therefore extended their practical cooperation in the control of banks, insurance and investment companies. The central banks regularly publish reports on financial stability in which they increasingly set their focus on the cross-border activities of the financial institutions in their domains.

## 7.5 Monetary policy strategies in the Nordic countries

It has been pointed out in Sections 7.1 and 7.2 that the Scandinavian central banks pursue different targets in varying frameworks of monetary policy. Sweden has

<sup>8</sup> The share of the five largest banks in the respective domestic sector's total balance sheet was 71 per cent in Norway, 84 per cent in Denmark, 94 per cent in Sweden and 96 per cent in Finland.

an independent central bank that follows an **inflation target** (2 per cent,  $\pm 1$  per cent) under flexible exchange rates. Denmark too has an independent central bank, but it has pegged its currency to the euro at an exchange rate of 7.46 DKR/€ in the narrow target zone of ERM II ( $\pm 2.25$  per cent). Norway has a less independent central bank which, however, can exert more discretion in preserving monetary stability as it has gone over from a 'soft' exchange rate target to inflation targeting. Finland no longer has a monetary policy of its own, as it is a member of the European Monetary Union; the Bank of Finland supports the European Central Bank in its pursuit of an inflation target, but that target (2 per cent or less) is defined as an average of the whole Eurozone, not of Finland alone.

In this last section, we shall discuss the following questions: Why this diversity? And can the national monetary policy strategies diverge when the main players in the private sector converge to large transnational financial groups? The first question is about the recent past, the second is about the near future.

### 7.5.1 The origins of the diversity

Until autumn 1992 all four Scandinavian countries adhered to similar types of fixed exchange rate arrangements. As an EEC member, Denmark joined the exchange rate mechanism of the European Monetary System (EMS) in 1979, whereas the other three countries pegged their currencies to trade-weighted currency baskets. Yet exchange rate stability was difficult to achieve, as the oil crisis of 1973/74 had set off price-wage spirals that led to relatively high inflation in the Scandinavian countries, reinforced by the effects of income tax progression. Due to the fast increase in unit costs, the Scandinavian industries began to lose ground in their export markets. Devaluations were often used as a way out of this problem, but they tended to come late, to weaken the confidence of investors and to add to the inflation problem by raising import prices. During the 1970s and early 1980s, all four countries were thus caught in vicious circles of inflation and devaluation which eroded both the competitive advantages of the region's export industries and the systems of credit and exchange controls.

Due to its constraints in the EMS, Denmark was the first country to break these circles by going over to a rigorous austerity policy, but the change to low inflation and durable exchange rate stability came at the hefty

cost of high and persistent unemployment. This was a price that the other countries, in particular Sweden, were not prepared to pay. Instead, Sweden tried to fight its way out of the dilemma by way of a shock devaluation, combined with fiscal consolidation, wage restraints and financial market deregulation. The 16 per cent devaluation of the Swedish crown in October 1982 was meant to stimulate exports and thereby growth and employment, but the Swedish government made it clear that this had to be the last action of its kind, if the inflation trend was to be broken. The crown was firmly pegged to a new target exchange rate vis-à-vis the currency basket. The deregulation and liberalization of the financial sector was meant to subject the wage and price setters in the country to the discipline of interest rate and loan constraints. Norway and Finland followed suit – though somewhat grudgingly, because the Swedish shock devaluation had put their own export industries at a disadvantage.

The hopes of reining in inflation by way of financial market deregulation were unfounded, as we saw in Section 7.4. The inflationary impulses of wage and tax policies were replaced by the debt–asset price cycles in the real property and equity markets. Increasing deficits in the current accounts had to be financed with capital inflows that further contributed to inflation. When the first signs of a recession weakened the confidence of investors and threatened exchange rate stability in 1990/91, Norway, Sweden and Finland pegged their currencies to the ECU (European Currency Unit) in order to win credibility for their disinflationary policies. Like other central countries in Europe, they hoped to be able to achieve price-level stability by way of preserving strict exchange rate stability.

However, these measures backfired on the economies and eventually on the monetary policy strategies. Keeping the exchange rates fixed in terms of the ECU, or rather the Deutschmark as the anchor currency of the EMS, required a policy of high interest rates, since the German *Bundesbank* began to raise its key rate in order to fight the inflationary impulses in the wake of German reunification. The restrictive monetary policies in Sweden, Norway and Finland aggravated the problems with credit losses that had begun to develop in the banking systems.

In the summer of 1992 all hell was let loose when a referendum in Denmark resulted in a 'No' to the Maastricht treaty and its plans for a European Monetary Union. As the trend towards irreversibly fixed exchange rates in Europe seemed no longer certain, it became

attractive to speculate against the currencies of European countries that suffered either from high inflation or from high unemployment. The Danish crown was relatively well protected, since its peg to the ECU was multilaterally defended, mainly by support from the German *Bundesbank*. The northern Scandinavian currencies were unilaterally pegged to the ECU and they were traded in small foreign exchange markets with few big players. This made them much easier targets for speculative attacks.

The Swedish government and the *Riksbank* were determined to defend the symbol of their newly won credibility, the fixed ECU exchange rate, at all costs. In September 1992, the *Riksbank* raised its lending rates to the banks to 500 per cent in order to stop the vicious circle of self-fulfilling expectations which threatened to develop from the massive increase of loans at Swedish banks that were converted into foreign currencies in speculative anticipation of a devaluation of the crown. These draconian measures, rather uncommon in highly developed economies in times of peace, only brought the banking system closer to collapse and invited further speculative attacks. After very costly but eventually futile interventions in the foreign exchange markets the *Riksbank* abandoned the unilateral ECU parity in November 1992. Finland had gone over to floating exchange rates in September, and Norway followed in November.

To sum up, there is some irony in the fact that the northern Scandinavian countries tried to use the deregulation of the financial sectors as a vehicle for regaining interest rate control and winning credibility for their policies of disinflationary exchange rate targeting. The inflationary dynamics of the deregulation process contributed to the deep economic and banking crises which, in turn, made the exchange rate arrangements unsustainable.

Yet the four Nordic countries have all reacted differently to the currency crises of the early 1990s. Denmark survived the speculative attacks and stuck to its ECU peg (now a euro peg), but it did not join the European Monetary Union (EMU) because there is strong political opposition to the project of a single European monetary policy in the country. Once bitten, twice shy, public opinion in Sweden is also dominated by eurosceptical positions, and it is widely argued that it is easier to fight inflation by directly targeting it in the country than leaving monetary policy decisions to some central bank in Frankfurt. In the referendum of September 2003, a clear majority of Swedish voters rejected the govern-

ment's plans to join the EMU. By contrast, Finland took the bull by the horns and joined the EMS in 1997 in order to become an EMU member right from the start. Norway has preferred to stay outside the European Union altogether, but it adopted a 'soft policy' of stable exchange rates shortly after the turmoil of 1992. The underlying motivation was to keep the Norwegian economy, and in particular its sectors outside the oil and gas industry, under competitive pressure. The difference compared with the earlier unilateral ECU parity was that the authorities did not define a new parity with fluctuation margins, but declared their intent to react to shocks in the foreign exchange markets by gearing monetary policy to returning the euro exchange rate gradually to its initial range. However, even this soft exchange rate targeting had to be given up in favour of inflation targeting, when the end of the 'dotcom bubble' made the Norwegian *kroner* vulnerable to speculative attacks.

### 7.5.2 The problems of diversity

So far, all the different choices of monetary policy regimes in Scandinavia can be considered as being successful in terms of both preserving price-level stability and regaining financial sector stability. Yet it is not certain that the diversity of strategies can be sustained in the long run. General macroeconomic developments were unusually favourable in the second half of the 1990s, and the downswing at the turn of the century was softened by globally low interest rates. The new strategies have not yet been put to the test of sudden increases in real interest rates.

Apart from macroeconomic concerns, problems may also arise from the ongoing concentration in the financial sectors of the Nordic region. In the past decades, the Scandinavian central banks have supported the creation of domestic money and bond markets in order to make use of the banks' competition for liquidity. Now they face fewer and bigger players in those markets. Moreover, the transnational financial groups have more opportunities for cross-border arbitrage and for the circumvention of specific restrictions in the countries. This may contribute to rendering monetary policy less effective or, in the case of Sweden and Norway, less independent in the pursuit of national inflation targets. Take, for example, the risks for financial stability that arise from the high level of shareholding in Sweden. If there is a sudden fall in share prices, as



in 2000/01, the negative wealth effect on investment and consumer spending will tend to be stronger than in other countries. This could induce the *Riksbank* to lower its interest rates in order to meet its inflation target.<sup>9</sup> If the rates come to be lower than elsewhere in Europe, banks could use the Swedish money market for borrowing funds to invest them in other countries, while investors would stay away from the Swedish markets because they can earn more elsewhere. The market levels of interest rates in Sweden would adjust to or even rise above the levels in the Eurozone, due to a risk premium.<sup>10</sup>

It may therefore be concluded that the diversity of monetary policy targets and frameworks in Northern Europe will be a transitory episode, born out of the crisis of its financial systems and doomed to give way to further integration of the financial sectors even at the monetary policy level – perhaps within the European Monetary Union or some satellite arrangement such as the EMS II.

## 7.6 Summary

The financial systems in Northern Europe are dominated by a few large domestic banks that have recently evolved into even larger Nordic financial groupings by way of cross-border mergers and acquisitions. Until the 1980s, the domestic banks were protected from the competition of foreign banks, but at the same time subject to extensive credit and exchange controls. The financial sectors were segmented by separate systems of regulation for different financial intermediaries. As quantitative regulations of credit and capital flows became increasingly ineffective in the 1980s, the monetary authorities in Scandinavia created money markets and other arenas for interest rate policies, by which they attempted to meet their exchange rate targets. The financial markets were deregulated and opened for capital flows across the borders.

The opening of the markets created a credit boom, a rise in inflation rates and speculative bubbles in property and equity markets that were supported by huge capital inflows. Due to a combination of internal overheating and external shocks, real interest rates in Scandinavia rose to unprecedented levels around 1990. The speculative bubbles burst and produced a wave of bankruptcies, which led to a deep recession and severe banking crises in Sweden, Norway and Finland (and milder problems in Denmark) in the early 1990s.

As a consequence, the monetary authorities in Scandinavia began to diverge in their approaches to central bank independence and the setting of targets for monetary policy. While Denmark continued to peg its exchange rate to the ECU (now to the euro), Sweden has left its exchange rate floating and followed an inflation target since 1992. The central banks in both countries have gained operational independence vis-à-vis the respective governments. Norway has kept its central bank under the close control of parliament while going over to a softer exchange rate target and, more recently, to an inflation target. Finland has joined the European Monetary Union, thereby giving up its (formal) independence in all matters of monetary policy.

Thus there is some irony in the fact that the northern Scandinavian countries tried to use the deregulation of the financial sectors as a vehicle for regaining control over bank lending and winning credibility for their policies of disinflationary exchange rate targeting. The inflationary dynamics of the deregulation process contributed to the deep economic and banking crises which, in turn, made the original policies of fixed exchange rates unsustainable and created a diversity of monetary policy frameworks. Yet as the main players in the Nordic financial systems have begun to converge to large transnational financial groups the question arises whether the national monetary policy strategies in the Nordic countries can diverge in the longer run – or whether they, too, will converge in the European Monetary Union (or some satellite arrangement).

<sup>9</sup> It should be noted that Sweden has had exceptionally low inflation rates in the 1990s, often at or even below the lower boundary of the target zone (1–3 per cent). Due to measurement problems in the inflation rate, this would be considered as deflation which, in turn, tends to have a negative effect on real economic activity.

<sup>10</sup> However, in the downswing between 2000 and 2003 there was no big difference between the wealth effects in Sweden and in the core economies of the euro area. The *Riksbank* has kept short-term interest rates relatively high and the difference between long-term interest rates in Sweden and in the euro area rarely exceeded half a percentage point.

### Key concepts used in this chapter

‘Top-down’ approach to the evolution of commercial banking	Banking and currency crises
Concentration in the banking sector	Bad banks
Strategic shareholding of banks	Inflation target
Credit and exchange controls	Strict and soft exchange rate targets
Deregulation and liberalization	Cross-border integration
Debt–asset price cycle	All-finance <i>alias</i> bancassurance

### Questions and problems

- 1 Describe briefly and explain the differing approaches to monetary policy among the Scandinavian countries.
- 2 Compare and contrast the structure of the banking systems of Norway, Sweden, Denmark and Finland, paying particular attention to the role of the central bank.
- 3 How would you explain the banking crises suffered by Norway, Sweden and Finland in the 1980s and 1990s? How did these crises lead to changes in the structure of the financial systems as well as to changes in the targets of monetary policy?
- 4 Discuss the pros and cons of using bad banks and public subsidies for rescuing (half-)private banks from insolvency.
- 5 Explain why the market shares of big banks, or the degrees of concentration, tend to be higher in small economies (compared to larger economies).

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Part 3

# Theory



## Chapter 8

# Portfolio theory

### *What you will learn in this chapter:*

- How to describe financial assets by reference to their risk and return
- Why lenders are risk averse
- Why diversification helps to reduce risk
- How to calculate portfolio risk and return
- Why lenders prefer some portfolios to others
- How financial markets price risk
- How to price the risk attaching to an individual asset
- How to calculate the return required on an individual asset

## 8.1 Introduction

In this chapter we explain how lenders decide on the allocation of their surplus funds, or to put it another way, how they decide what assets to hold. The answer is that they will hold those assets that give them the rate of return they require, in view of the risk which attaches to the asset. So our question has now become ‘how do lenders decide on the rate of return that they require on an asset?’ Stated briefly, our explanation is that this required rate of return on an asset consists of the risk-free rate of interest (set in the economy at large) plus a risk premium (reflecting characteristics of the individual asset). In this chapter we focus largely upon the risk premium. The setting of the risk-free rate of interest is explained in Chapter 9.

Notice that if we can answer this question we can also answer the question, for tradable assets, of what determines their *market price* since the equilibrium price must be that at which lenders think they are getting the right rate of return. Formal demonstrations of this appear in Section 8.5 where we bring together the risk premium and the risk-free rate in models of asset pricing, but it is not difficult to understand intuitively. If we take a simple asset which pays a fixed amount in perpetuity, then the rate of return is clearly the payment ( $D$ ) divided by the price ( $P$ ). Suppose all else remains the same (including the fixed payment) while asset holders decide that the return is no longer good enough, perhaps because more attractive assets appear. All they can do is sell. This drives down the price, increasing the payment as a fraction of the price ( $D/P$  increases), until a new, higher rate of return emerges which makes the asset attractive again. Thus, in explaining how investors decide upon the required rate of return, we are, in effect, explaining the demand side of a supply/demand framework of asset pricing.

## 8.2 Risk and return

In choosing what assets they wish to hold people are assumed to be *risk-averse income maximizers* and thus to be seeking the maximum return for a given level of risk or, to put it another way, the minimum risk for a given level of return. The return on an asset is usually expressed as its average or **mean return** ( $\mu$ ) over a period of time. This will consist of any income

(interest or dividend) that the asset earns plus any capital gain (or loss). Thus the return on an asset in period 1,  $K_1$ , is given by:

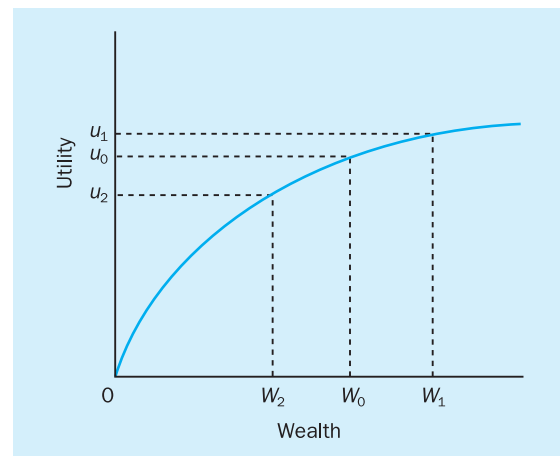
$$K_1 = \frac{D_1 + (P_1 - P_0)}{P_0} \quad (8.1)$$

where  $P_0$  is the price of the asset at the end of the previous period. The (arithmetic) mean return over  $T$  periods is:

$$\mu = \frac{\sum_{t=1}^{t=T} K_t}{T} \quad (8.2)$$

**Risk** is usually defined as *the probability that the actual return may differ from the expected return*. Notice that this view of risk embraces both the possibility that the actual return may exceed what we expect and the possibility that it may be less than we expect. *Actual risk* in this context is therefore symmetrical. However, people’s *attitudes to risk* may be asymmetrical. They may be more concerned with the possibility of loss than with the possibility of gain. It is this asymmetric attitude that we are referring to in the phrase ‘**risk aversion**’. ‘Risk’ may only mean an equal chance of winning and losing but people do not like it. Why should this be the case?

The generally accepted answer lies in the idea of the *diminishing marginal utility of wealth*. By this we mean that a given addition to wealth is valued less highly than the loss of an equivalent amount. Figure 8.1 illustrates the proposition. An individual



**Figure 8.1** The diminishing marginal utility of wealth

is assumed to have a given amount of wealth, shown on the horizontal axis by  $W_0$ . This yields a certain amount of utility,  $u_0$ , shown on the vertical axis. An increase in wealth from  $W_0$  to  $W_1$  increases utility from  $u_0$  to  $u_1$ . A decrease in wealth of an equal amount is shown by the movement from  $W_0$  to  $W_2$ .

Notice now that the reduction in utility is shown by the movement from  $u_0$  to  $u_2$  but that the distance  $u_0 - u_2$  is greater than the distance  $u_1 - u_0$ . That is:

$$\frac{u_0 - u_2}{W_0 - W_2} > \frac{u_1 - u_0}{W_1 - W_0} \tag{8.3}$$

If it is true that people are risk averse, they will be less willing to hold a risky asset than they will be to hold an asset with little or no risk. Indeed, as we said in Section 1.2.1, they will hold the more risky asset only if they receive a higher reward. But judging between assets on the basis of their risk requires that we be able to measure risk itself. As we shall see in Section 8.4, this can become quite complicated. But we can start with a simple idea. If we define risk as the probability that an individual outcome may differ from what was expected then it seems reasonable to suggest that we measure risk by examining the degree of variation in the return over a period. On our definition, an asset which has shown a wide dispersion of actual returns around the mean is riskier than one where returns have been tightly clustered around the mean value. In technical terms, the dispersion of values around a mean is expressed by the **variance**,  $\sigma^2$ . An alternative is the **standard deviation**,  $\sigma$ , the square root of the variance. The variance is found by:

$$\sigma^2 = \frac{\sum(K_i - \mu)^2}{T} \tag{8.4}$$

Thus, we can now say that:

the key characteristics of any asset can be described by the mean value and the variance of its returns.

Notice that the former tells us what an investor can expect to earn from holding the asset over a period of time and the latter tells us the degree of risk associated with those returns.

Unfortunately, the mean and variance of an asset can only be known *ex post*, while investors' decisions must be forward looking. This means that they have to make decisions on the basis of what they *expect* to happen. This raises the very tricky question of just how people form expectations of future economic and financial events. The obvious starting point is that

expectations are based in some way on what has happened in the past. However, 'in some way' leaves open a lot of possibilities. It seems reasonable perhaps to suggest that people are guided by what they have observed to happen in particular circumstances in the past, together with some assessment of the likely probability of those circumstances occurring again. On this basis, the expected return on an asset, which we write as  $\hat{K}$ , can be calculated as follows:

$$\hat{K} = \sum P_i K_i \tag{8.5}$$

where  $P_i$  is the probability of a particular state of affairs and  $K_i$  is the return expected in those circumstances. The corresponding calculation for the variance is then:

$$\sigma^2 = \sum P_i (K_i - \hat{K})^2 \tag{8.6}$$

In Box 8.1, share A is expected to produce annual returns ranging from 8 to 18 per cent per annum depending on the state of the economy. The probability of the economy being in a state of 'boom', 'normality' or 'slump' in the next time period varies between 30 per cent, 50 per cent and 20 per cent respectively. The expected return on the share is 14 per cent and its variance is 12.0. Notice that its standard deviation,  $\sigma$ , is 3.46 per cent ( $= \sqrt{12.0}$ ).

**Box 8.1 Mean and variance**

		Share A				
State	$P_i$	$K_i\%$	$P_i K_i$	$(K_i - \hat{K})$	$P_i (K_i - \hat{K})^2$	
Boom	0.3	18.0	5.4	4.0	4.8	
Average	0.5	14.0	7.0	0.0	0.0	
Slump	0.2	8.0	1.6	-6.0	7.2	
				$\hat{K}_A = 14.0$	$\sigma_A^2 = 12.0$	

**8.3 Diversification**

It seems intuitively obvious that the degree of risk to which investors are exposed can be reduced by **diversification**. Indeed, this is one of the many benefits that intermediaries offer to lenders (see Section 1.3.2). We can show that this piece of common sense has a firm basis in fact. Furthermore, we can also show that combining assets into a portfolio can usually reduce risk 'more cheaply', that is to say with a smaller



sacrifice in return, than would be the case if we simply switched from one (single) risky asset to another less risky (single) one.

The most dramatic effect in risk reduction comes in the early stages of diversification, as we go from one to five to ten assets, say. In fact, after diversification to holding around 20 assets the degree of risk reduction that comes from further expansions of a portfolio is very small.

For simplicity, therefore, we shall illustrate the risk-reducing effect of diversification by expanding from a one-asset to a two-asset portfolio. Assume that we are faced with choosing between the share *A* in Box 8.1 and another share *B* which is expected to give a return varying between 12, 8 and 8 per cent (see Exercise 8.1) per annum in the ‘boom’, ‘normal’ and ‘slump’ states. At this point, you should calculate the expected return and variance of share *B* in Exercise 8.1, before going on.

Obviously we could put all our funds into *A* or into *B*, or we could split our investment between the two. Consider firstly the effect upon returns. The general expression for portfolio return is:

$$\hat{K}_p = \sum w_i K_i \tag{8.7}$$

where  $w_i$  is the ‘weight’ or proportion of the portfolio allocated to each security and  $K_i$  is the return on each asset. (We have dropped the subscript  $t$  indicating a given time period in order to make the expressions easier to read.) We can apply the general expression in Equation 8.7 to our specific case. If, for example, we put one half of our funds into each of *A* and *B* (whose return in Exercise 8.1 is 9.2 per cent) then we have an expected return of:

$$\hat{K}_p = 0.5(14.0) + 0.5(9.2) = 11.6\%$$

Portfolio return is therefore quite simply the weighted average of its components.

**Exercise 8.1 Mean and variance**

State	$P_i$	Share B		$(K_i - \hat{K})$	$P_i(K_i - \hat{K})^2$
		$K_i\%$	$P_i K_i$		
Boom	0.3	12.0			
Average	0.5	8.0			
Slump	0.2	8.0			
		$\hat{K}_B =$			$\sigma_B^2 =$

(Answers appear in the text.)

When we consider the effect of diversification upon risk, however, the picture is more complex, but also more interesting. It is not a simple weighted average, though the proportions allocated to each asset do play a part. Using the standard deviation as the measure of risk the general expression for a two-asset portfolio is:

$$\sigma_p = \sqrt{X_A^2 \cdot \sigma_A^2 + X_B^2 \cdot \sigma_B^2 + 2X_A(X_B) \cdot \text{cov}K_A, K_B} \tag{8.8}$$

where  $X_A, X_B$  are the relative proportions of asset *A* and *B* in the portfolio. The first part of the expression:

$$X_A^2 \cdot \sigma_A^2 + X_B^2 \cdot \sigma_B^2 \tag{8.9}$$

clearly is just a weighted average of the variances of each of the two assets (albeit weighted by the squares of the proportions held). The interesting part of Equation 8.8 is the second part:

$$2X_A(X_B) \cdot \text{cov}K_A, K_B \tag{8.10}$$

which features the **covariance** of returns between the two assets. The covariance can be written as:

$$\text{cov}K_A, K_B = \sigma_A \cdot \sigma_B \cdot \rho_{AB} \tag{8.11}$$

Notice that the covariance includes the standard deviation of each asset but it also includes a term,  $\rho_{AB}$ , which is the **correlation coefficient of returns** between *A* and *B*. While the variance of each asset,  $\sigma^2$ , measures the size of variability or dispersion of returns around the mean value, the correlation coefficient measures the degree to which the returns on any two assets, be they highly variable or not, actually *move together*.

This is clearly important if we are interested in risk and if we define risk in terms of variability. After all, we could imagine two assets each with a large variance which would therefore be very risky if held in isolation. But suppose that whenever the return on one went up, the return on the other went down. We could then combine them in such a way that returns were constant because the variations would cancel out and the portfolio variance and standard deviation would be zero. We come back to this later in this section.

Let us see what happens in the present case. We have most of the information necessary for a solution to Equation 8.8. We shall assume that we split our investment equally between *A* and *B* and so  $X_A$  and  $X_B$  each have the value 0.5. The variances,  $\sigma_A^2$  and  $\sigma_B^2$ , we have calculated above. What we do not yet have is a value for the covariance term, Equation 8.11. The covariance can be found as follows:

$$\text{cov}K_A, K_B = \sum P_i (K_A - \hat{K}_A)(K_B - \hat{K}_B) \tag{8.12}$$

where  $K_A$  and  $K_B$  are the returns on  $A$  and  $B$  in each state of the economy as shown in each of the tables above. ( $K_A$  and  $K_B$  are in effect short for  $K_i(A)$  and  $K_i(B)$ .) In our case, therefore:

$$\begin{aligned}\text{cov}K_A, K_B &= 0.3(18 - 14)(12 - 9.2) \\ &\quad 0.5(14 - 14)(8 - 9.2) \\ &\quad 0.2(8 - 14)(8 - 9.2) \\ &= 3.36 + 0.0 + 1.44 \\ &= 4.8\end{aligned}$$

Putting everything together (including the variance of share  $B$ ) we can now solve Equation 8.8 and find the standard deviation of our two-asset portfolio as follows:

$$\begin{aligned}\sigma_p &= \sqrt{0.5^2(12) + 0.5^2(3.36) + 2(0.5)(0.5)4.8} \\ &= \sqrt{3.0 + 0.84 + 2.4} \\ &= \sqrt{6.24} \\ &= 2.50\end{aligned}$$

Let us now summarize our three investment possibilities: putting all our funds into  $A$  or all into  $B$  or dividing them equally between  $A$  and  $B$  in a portfolio,  $C$ .

	A	B	C
$\hat{K}$	14.00	9.20	11.60
$\sigma$	3.46	1.83	2.50

Investing entirely in  $A$ , we can expect a return of 14 per cent per annum if we are prepared to accept a standard deviation of returns of 3.46. If this seems too risky, one alternative is to invest entirely in  $B$ . This gives us a very large reduction in risk but we have to accept also a reduction in the expected return to 9.2 per cent. Looking at  $C$ , we can see that splitting our investment equally between  $A$  and  $B$  means, predictably, that we have to accept half of the reduction in returns but we can still get *more than half of the risk reduction effect* that we would have had from putting everything into  $B$ . A way of expressing this more formally is to say that in going from  $A$  to  $B$  we reduce risk at the rate of 0.34 for every unit reduction in return (1.63/4.8). In going from  $A$  to a split portfolio,  $C$ , however, we 'buy' the reduction at a rate of 0.40 for every one point reduction in return (0.96/2.4).

The reason for this reduction in risk per unit rate of return lies in the correlation coefficient of returns between the two assets. If we compare the way in which returns on share  $A$  and share  $B$  vary in different states of the economy, we can see firstly that they move

together in the sense that they both go up when the economy moves from normal to boom but only the return on  $A$  goes down when we move from normal to slump.  $B$  is what might be called a good 'defensive' security. We can also see that the overall variability of  $B$  is less than that of  $A$ , which is what we discovered in calculating their variances. These differences mean that the returns are less than perfectly correlated – that is, the correlation coefficient is less than +1. We can calculate the correlation coefficient from the covariance by rearranging Equation 8.11.

$$\rho_{AB} = \frac{\text{cov}(K_A, K_B)}{\sigma_A \cdot \sigma_B} \quad (8.13)$$

In this case, the correlation coefficient of returns is:

$$\rho_{AB} = 4.8 / (3.46 \times 1.83) = 0.76$$

Perfect correlation is indicated by a correlation coefficient of +1 while complete negative (offsetting) correlation is signified by a coefficient of -1. To see why the correlation coefficient is so important in reducing the risk of a portfolio below that of its component parts, consider the effect of these extreme values in the expression for a portfolio, Equation 8.8. Remember that we divided this complex expression into two parts: the first (Equation 8.9) was based on the variances of the portfolio's components, the second (Equation 8.10) featured the covariance of returns between the components. If the correlation coefficient is negative then it follows that the covariance term (Equation 8.10) will be negative. The effect of the standard deviations of the individual securities contained in the covariance will then work to *reduce* the effect of the variances in the first part (Equation 8.8) of the portfolio risk formula and the negative effect will be at its greatest when the coefficient takes the extreme value of -1. On the other hand, for any value greater than zero, the effect of the correlation coefficient will be that the effect of the standard deviations in the covariance will be *added* to the effect of the variances in the first part of the portfolio risk formula. The covariance's contribution to risk will be greatest when the coefficient takes the value of +1. In these circumstances, there is no benefit from diversification and it follows then that the portfolio's risk must be equal to the weighted average of the standard deviation of its components. This is illustrated in Exercise 8.2.

The conclusion we have come to then, and it is fundamental to understanding the behaviour of individual investors and financial intermediaries, is that:

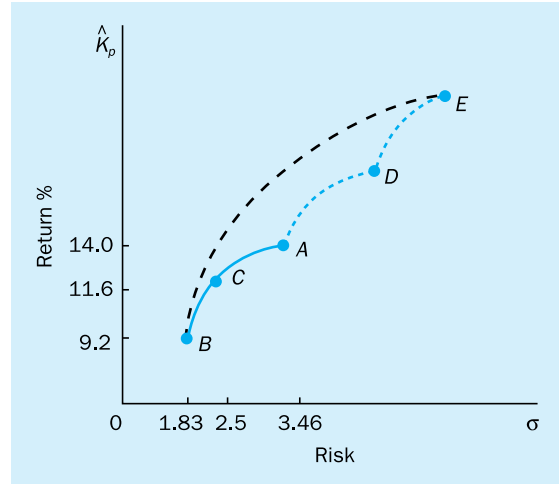
provided the returns on assets are less than perfectly correlated, the greater the degree of portfolio diversification, the lower will be the level of risk associated with a given return.

**Exercise 8.2**

- 1 Calculate the covariance for our hypothetical portfolio, C, by substituting +1 for the correlation coefficient  $\rho_{AB}$  in Equation 8.11, leaving all other values unchanged. Then recalculate the standard deviation of the two-asset portfolio. Compare the risk attaching to this portfolio with the risk that you would incur by putting 50 per cent of your wealth into asset A and 50 per cent into asset B.
- 2 Recalculate the covariance and portfolio standard deviation again, setting  $\rho_{AB} = -1$ .
- 3 Leaving  $\rho_{AB} = -1$ , combine A and B in order to produce zero portfolio risk.

(Answers appear in Box 8.2.)

This can be seen in Figure 8.2. Points A and B show the risk and return associated with our two assets A and B from earlier in this section. Point C represents the risk and return that we calculated for a portfolio composed of equal quantities of A and B. Notice, on the vertical axis, that the return associated with C



**Figure 8.2** Efficient portfolios

comes exactly halfway between the returns on A and B, while the risk, on the horizontal axis, is less than halfway between the risk of A and the risk of B. C represents a portfolio of equal weights, but we could have any weight for asset A ranging from 0 to 100 per cent and the corresponding weight for B would be the residual. If we were to plot the risk/return combinations for all these different portfolio compositions, then the results would lie on the smooth curve between A and B. Notice that the curve is convex to the vertical

**Box 8.2 Three answers**

When  $\rho_{AB} = +1$ , and other values remain as they were, the standard deviation of our two-asset portfolio, C, = 2.64. This is because when returns are perfectly correlated, we know from Equation 8.11 that the covariance term in Equation 8.8 simplifies to  $\sigma_A \cdot \sigma_B$ . Thus Equation 8.8 can be written:

$$\sigma_p = \sqrt{X_A^2 \cdot \sigma_A^2 + X_B^2 \cdot \sigma_B^2 + 2X_A(X_B)\sigma_A \cdot \sigma_B}$$

This in turn simplifies to:

$$\sigma_p = X_A\sigma_A + X_B\sigma_B$$

which is simply a weighted average of the standard deviations of the returns on the individual assets.

When  $\rho_{AB} = -1$ , and other values remain as they were, the standard deviation of our two-asset portfolio, C, = 0.821. The reasoning parallels that above, except that the simplification of the covariance term to  $\sigma_A \cdot \sigma_B$

is accompanied by a minus sign. Thus Equation 8.8 can be written:

$$\sigma_p = \sqrt{X_A^2 \cdot \sigma_A^2 + X_B^2 \cdot \sigma_B^2 - 2X_A(X_B)\sigma_A \cdot \sigma_B}$$

This in turn simplifies to a positive portfolio standard deviation of:

$$\sigma_p = X_A\sigma_A - X_B\sigma_B \quad \text{or} \quad \sigma_p = X_B\sigma_B - X_A\sigma_A$$

We commented earlier in this chapter that if two assets were perfectly negatively correlated then it was possible to construct a zero risk portfolio. This requires merely that we choose appropriate proportions of each asset, that is, appropriate values for the X's. These values can be found as follows:

$$X_A = \sigma_B / (\sigma_A + \sigma_B), \quad X_B = \sigma_A / (\sigma_A + \sigma_B)$$

To make a zero risk portfolio from our two assets, A and B, requires  $X_A \approx 0.35$  and  $X_B \approx 0.65$ .

(return) axis. This is entirely due to the risk reduction effect of diversification.

The curve joining *A* and *B* results from combining just those two assets. But in the real world there are many assets and we could combine, for example, *A* with *D* or *D* with *E* and so on. And we do not have to stop at just two assets. We could combine all risky assets together in almost infinite combinations. This would give us even lower risk for any given rate of return, and this is shown by the dashed envelope curve in Figure 8.2.

#### 8.4 'Market' and 'specific' risk

Figure 8.3 illustrates this conclusion in another way. As more securities are added to the portfolio, so the portfolio's standard deviation diminishes. Notice though that most of the risk reduction effect is achieved by the time the portfolio consists of 20 securities. Beyond that point, portfolio risk appears to settle at an irreducible threshold. Why should this be?

The downward-sloping portion of the curve is explained by our discussion in the last section and hinges on the correlation coefficient of returns. For most assets, the correlation coefficient of returns with other assets is less than +1. Think carefully what this means. Something happens that causes the return on asset *A*, say, to rise. The returns on some other assets also rise but not to the same degree and returns on some assets are unaffected. It might even be that the

returns on one or two assets move in the opposite direction. What this indicates is that each asset is affected to some extent by events which are unique to that asset. Combining assets in a portfolio means that the effect of a specific event on asset *A* will be partially offset by the effect of some other event on asset *B*. As the number of assets increases, the scope for this offsetting also increases. Risk arising out of events unique to particular securities is called **specific**, **unique** or **unsystematic** risk. Examples of events giving rise to specific risk can be found in good and bad news about individual borrowers – news about individual firms or about the industry in which they operate.

The near-horizontal part of the curve is explained by the fact that in addition to unique events, assets are also exposed to common sources of risk. Most company shares will be adversely affected by a downturn in the economy. Risk arising out of economy-wide events is called **market** or **systematic** risk. Not all will be affected to the same degree: some securities will be very sensitive to market events, some less so. But diversifying from one to many assets, or even changing the composition of the portfolio entirely, cannot eliminate market risk. A rational, risk-averse, investor will do everything possible to diversify away specific risk, but market risk always remains.

Since it measures the dispersion of returns around the mean value from a security held in isolation, standard deviation (or variance) is an attempt to measure **total risk**. That is to say:

$$\text{Total risk} = \text{market risk} + \text{specific risk} = \text{standard deviation}$$

However, we have just seen that diversification can reduce total risk by eliminating specific risk. Since anyone can diversify, the only risk which an investor is obliged to face is market risk. Three conclusions must follow. Firstly, no rational risk-averse investor will incur specific risk, since it is unnecessary. Secondly, the only reward that investors can expect to be paid for risk must be related to unavoidable, i.e. market, risk. (Because market risk is the only risk for which investors can expect compensation it is sometimes referred to as 'relevant' risk – all other risk is *irrelevant*.) Thirdly, standard deviation (by measuring total risk) must overstate the relevant level of risk faced by any investor who behaves rationally. The questions we are left with are 'how do we measure the relevant or market risk of an asset?' and 'how do we put a price on that risk?'

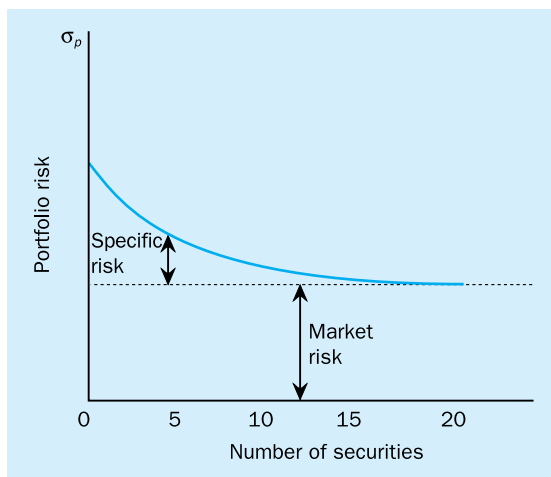


Figure 8.3 Benefits of diversification

### 8.5 The capital asset pricing model

One popular way of answering both questions lies in the capital asset pricing model, or CAPM. This states that:

The rate of return on an asset will be equal to the risk-free rate of interest plus a risk premium which depends upon the market price of risk and the quantity of market risk contained within the asset.

Notice two things. Firstly, although it is called the capital asset *pricing* model, our statement of it refers only to rates of return. We come back to this at the end of the section. Secondly, the statement involves three elements. We take each in turn.

The first element is the risk-free rate of interest. The relevance of the risk-free rate is that it puts a floor or threshold under the return on all risky assets. Risky assets must pay a return which *exceeds* the risk-free rate. Furthermore, for a given level of risk, one would expect the additional return to be a constant premium over and above the risk-free rate, whatever may happen to the latter. In other words, if the risk-free rate rises, then we would expect all other rates to be pushed up and the return on all risky assets to rise along with the return on risk-free ones. The risk-free rate should therefore be seen as a ‘floating’ threshold or baseline from which all other rates are derived by the addition of a premium. In practice, the risk-free rate is often approximated by the return on short-dated treasury bills. We denote it by  $K_{rf}$ .

The second and third elements relate to the risk premium to be added to the risk-free rate. The second element is the ‘market *price* of risk’. This can be thought of as the ‘going rate’ for some sort of ‘standard’ level of risk. What benchmark do we use? The answer takes us back to the distinction between market and specific risk again. We know that we can eliminate the latter by diversification. The greatest degree of diversification that we could achieve would be to hold a portfolio which contained *all* the risky assets available. The same could be achieved by holding a miniature portfolio which replicated the **whole market portfolio** of risky assets. In practice, what this would mean is holding a miniature portfolio composed of all the risky assets available to us in the proportions that they exist in the whole market. One might imagine that this involves holding a miniature reproduction of the whole stock market, though, strictly speaking, *all* risky assets should mean *all* risky assets – embracing

all financial assets and real assets too. The importance of the whole market portfolio, however it is defined, is that it represents the extreme case of diversification and therefore is subject solely to market risk. Any return earned by such a portfolio, over and above  $K_{rf}$ , must therefore be the premium uniquely associated with pure market risk.

In practice, the ‘whole market portfolio’ is often taken to mean the ‘whole share market portfolio’. In these circumstances, the return on the whole market can be fairly easily established by looking at the annual yield generated by shares in an ‘all share index’, together with movements in the index itself. This we shall call  $K_m$ . The difference between this result and the risk-free rate ( $K_m - K_{rf}$ ) is then the market risk premium, or the market price of risk. We can, if we wish, express this price *per unit of risk* by dividing the premium by the standard deviation of returns on the whole market portfolio. The market risk premium is our benchmark by which we shall judge the premium to be paid on individual assets.

Given this benchmark price, we now need to know how much of this price should apply to any individual asset. This is described in the third element: the *quantity* of market risk in the asset. This is found quite simply by comparing the behaviour of an individual asset with the whole market portfolio. What is compared is the variance of returns. And the logic is that if the whole market portfolio carries a risk premium of, say, 10 per cent, then an asset which shows twice the variability should have a 20 per cent premium, while an asset with only half the variance should have a risk premium of 5 per cent. Figure 8.4 shows how we might make the comparison between a single asset and the whole market.

Figure 8.4 is essentially a scatter diagram, where each point represents simultaneously the return on the asset (marked on the vertical axis) and the return on the whole market (marked on the horizontal axis). A ‘line of best fit’ is then drawn through the scatter of points. This can be done either by eye, or more precisely by using a regression technique like ordinary least squares. Clearly, the line when fitted could be ‘steep’ or ‘flat’, or it could be at 45°. If the slope is 45° the variation of returns on the individual asset exactly matches the variation of return on the whole market portfolio and the asset has the same exposure to market risk as the whole market portfolio. In these circumstances, the individual asset should earn the same premium as the whole market portfolio. If the slope is

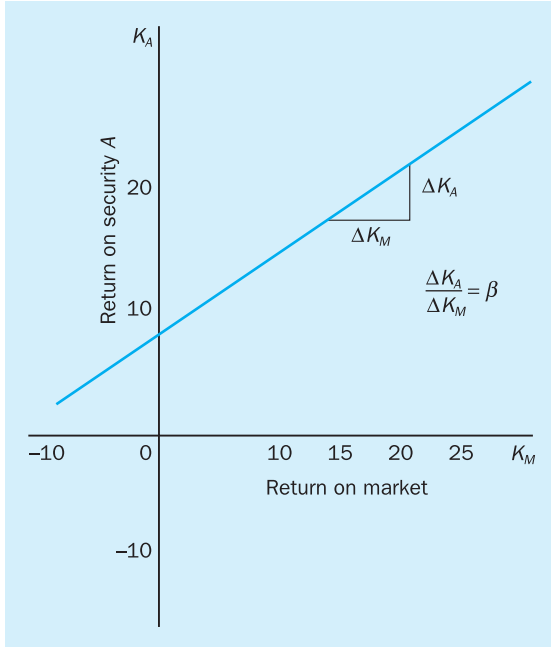


Figure 8.4 The  $\beta$ -coefficient

‘flat’, less than  $45^\circ$ , the asset shows less exposure to market risk and the premium should be smaller; if the slope is steep, greater than  $45^\circ$ , the risk premium on the asset should be greater than that on the whole market portfolio.

But we can be much more precise. Once we have drawn the line, we can measure its slope. In Figure 8.4, the slope is equal to  $\Delta K_i / \Delta K_m$ . If we fitted the line by regression techniques, the slope of the line would commonly be represented by  $\beta$ . For this reason, this measure of an asset’s exposure to market risk is often referred to as its  **$\beta$ -coefficient**. We can now see that if the line is drawn at  $45^\circ$ ,  $\beta = 1$ . If the line is steeper, then the  $\beta$ -coefficient is greater than 1; if the line is flatter, then the  $\beta$ -coefficient is less than 1.

Putting all of this together, we can now see that the CAPM tells us how to find the required return on a risky asset,  $A$ , for example. Letting  $\bar{K}_A$  stand for the required return, then:

$$\bar{K}_A = K_{rf} + \beta_A(K_m - K_{rf}) \tag{8.14}$$

Equation 8.14 is the equation for what is known as the **security market line** or **SML**. (Occasionally, the equation is said to represent the CAPM itself.) Using values for  $K_A$ ,  $K_{rf}$  and  $K_m$  taken from Exercise 8.3, we

**Exercise 8.3 The Capital Asset Pricing Model**

- (a) Using Equation 8.14, find the required rate of return,  $\bar{K}_i$ , on an asset whose  $\beta$ -coefficient is 1.2, when the whole market return is 18 per cent and the risk-free rate is 10 per cent.
  - (b) If there were an increase in the general level of risk aversion in the market, all else remaining unchanged, how would this affect  $\bar{K}_i$  and why?
- (Answers appear in the text below.)

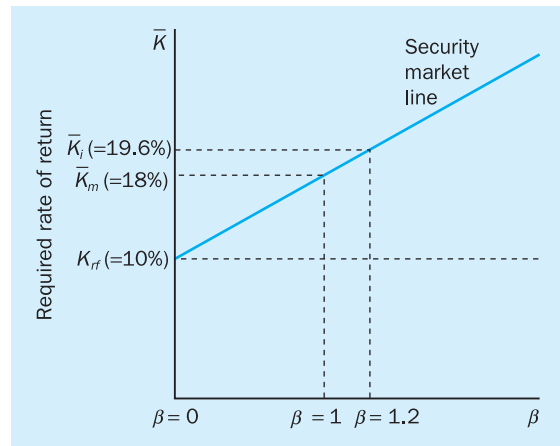


Figure 8.5 The security market line

have drawn the *SML* in Figure 8.5. The *SML* shows the additional return (above  $K_{rf}$ ) required on an *individual asset* whose risk characteristics can be compared with those of a whole market portfolio. It is these characteristics, expressed by  $\beta$ , which are drawn on the horizontal axis. Expressed in terms of *pricing*, rather than *rates of return*, the message of the CAPM is that assets which are ‘fairly priced’ will yield a rate of return such that they plot on the *SML*.

Notice firstly that an asset with no relevant risk,  $\beta = 0$ , has a required rate of return equal to the risk-free rate while an asset with  $\beta = 1$  has the same required return as the whole market portfolio. If we know the risk-free rate, the market risk premium and the asset’s  $\beta$ -coefficient we can read off the required rate of return. For example, in Exercise 8.3 our hypothetical asset had a  $\beta$ -value of 1.2 while the risk-free rate was 10 per cent and the whole market rate was 18 per cent. In this case  $\bar{K}_i = 10\% + 1.2(18\% - 10\%) = 19.6\%$ .

To understand what might cause the required return to change, we need to be careful, as always, to distinguish between movements *along* and movements *of* the *SML*. Consider firstly movements along the curve. Since the curve plots the required rate as a function of  $\beta$ , movements along the curve will occur whenever anything happens to affect a share's  $\beta$ -coefficient. This means that its exposure to market risk has changed. An increase in exposure will move us up the *SML*, increasing the required rate of return; reductions in risk will move us down the *SML*.

The *SML* itself can change in two senses: its slope may change or it may be subject to a parallel shift. Its slope is given by  $(K_m - K_{rf})/\beta$  and expresses the degree of risk aversion in the market. A change in slope will occur if, as we suggested in Exercise 8.3, there is a change in risk aversion. If, for example, there is an increase, then the market risk premium  $(K_m - K_{rf})$  and the slope of the *SML* increase. The required rate of return on assets also increases since although their risk has not increased, risk itself is priced more highly.

The *SML* can also change its position by a parallel shift. This will happen when the risk-free rate changes, all else remaining as it was. There is no change in the degree of risk and no change in its price. But the risk-free rate to which the premium is added may go up or down. The required rate of return, of course, moves in the same direction.

Finally, let us return to how being able to establish the required rate of return on an asset enables us to establish its *price*. In order to do this, consider the simplest possible rate of return – a cashflow of fixed amount, paid in perpetuity. An example might be an irredeemable government bond. A *rate* of return is calculated by dividing the actual amount received by the amount that we paid to receive the entitlement (see Equation 8.1). Suppose that we pay £100 for this bond and it pays an annual amount of £6. The rate of return is  $6/100 = 0.06$  or 6 per cent. Since there is a ready market for government bonds, we may suppose that £100 is a 'fair' price and this is because 6 per cent is the current going rate on long-dated assets of very low risk. But suppose that circumstances changed and returns on this kind of asset rose to 7 per cent. Our bond, paying only 6 per cent, would become less attractive and its price would fall until it could compete fairly again with other comparable assets paying 7 per cent. Its need to compete with other assets

immediately gives us a new price. It is that price at which the bond must trade to give buyers a 7 per cent return. This we can find by solving for  $x$ , where  $x$  is the price of the bond. By rearranging  $0.07 = 6/x$  we have  $x = 6/0.07 = 85.71$ . If this bond is to provide a return of 7 per cent its price must fall to £85.71.

We can now rephrase our earlier version of the CAPM to make it clear that it really does have pricing implications:

**The market will price an asset such that its rate of return will be equal to the risk-free rate of interest plus a risk premium which depends upon the market price of risk and the quantity of market risk contained within the asset.**

## 8.6 Summary

Other things being given, the price paid for an asset determines its rate of return. If we can explain the return required on an asset, therefore, we can explain why the market prices an asset as it does. Our explanation of asset returns is that the required rate of return is equal to the risk-free rate of return plus a fraction or multiple of the premium required for 'average' or 'standard' risk.

The benchmark risk premium is the difference in return between a whole market portfolio of risky assets and the risk-free rate  $(K_m - K_{rf})$ . This represents the price required by the market for holding a fully diversified portfolio. That is to say it is the price required for holding the minimum level of risk for a given return, since all risk that can be avoided has been eliminated by diversification. It is the only risk that rational, risk-averse, investors will be prepared to hold.

An individual asset attracts a proportion of this whole market risk premium, determined by its  $\beta$ -coefficient. We use the  $\beta$ -coefficient, rather than the standard deviation of returns, as a more relevant measure of an asset's riskiness in this situation because, again, rational investors will hold an asset only as part of a fully diversified portfolio. The  $\beta$ -coefficient is relevant because it measures the risk brought by an asset to a portfolio, taking account of its covariance of returns with the whole market as well as its standard deviation.

## Key concepts in this chapter

Risk	Covariance	Risk-free lending
Return	Correlation coefficient of returns	Whole market portfolio
Risk aversion	Total risk	Whole market rate of return
Standard deviation	Market risk	Security market line
Variance	Specific risk	$\beta$ -coefficient
Mean	Capital asset pricing model	
Diversification		

## Questions and problems

- 1 What is meant by risk in a financial context? Why are people assumed to be risk averse?
- 2 Why does the diversification of asset holdings generally lead to a reduction in risk?
- 3 Are there any limits to the benefits of diversification? If so, why?
- 4 Distinguish between market risk and specific risk.
- 5 Why does the return on assets reflect only their exposure to market risk?
- 6 If the riskiness of an asset can be described by its variance, why do we need the  $\beta$ -coefficient?
- 7 Explain how you would expect each of the following events to affect the security market line and the required rate of return on a given share (imagine that each event occurs independently of the others):
  - (a) an increase in official short-term interest rates;
  - (b) a reduction in the degree of risk aversion in the market;
  - (c) an increase in the uncertainty of the share's future prospects.

## Further reading

D Blake, *Financial Market Analysis* (London: McGraw-Hill, 2e, 2000) Ch. 13  
 Z Bodie, A Kane and A J Marcus, *Essentials of Investments* (New York: McGraw-Hill, 2001) Ch. 2  
 E J Elton and M J Gruber, *Modern Portfolio Theory and Investment Analysis* (Chichester: Wiley, 5e, 1995) Ch. 13

P G A Howells and K Bain, *Financial Markets and Institutions* (Harlow: Pearson Education, 4e, 2004) Ch. 1  
 K Pilbeam, *Finance and Financial Markets* (London: Palgrave, 1998) Ch. 7  
 J M Samuels, F M Wilkes and R E Brayshaw, *Management of Company Finance* (London: Chapman and Hall, 5e, 1990) Ch. 9



## Chapter 9

# The determination of short-term interest rates

### *What you will learn in this chapter:*

- The distinction between real and nominal interest rates
- The meaning of liquidity, risk and inflation premiums
- The loanable funds and liquidity preference theories of interest and the assumptions behind them
- The Fisher effect and its role in linking nominal and real rates of interest
- The origin and limitations of central bank influence over interest rates

## 9.1 Introduction

No one interested in economics or finance would doubt the importance of interest rates. Consider just a few possible reasons:

- the rate of interest is a payment from borrowers to lenders;
- asset values move inversely with changes in interest rates;
- interest rates are part of the cost of firms' investments;
- interest rates affect the exchange rate;
- interest rates affect bank lending and monetary growth.

The first two in this list are particularly important in financial theory. For example, in the last chapter we established that lenders would require a reward which compensated them for the degree of risk that they felt they were running by lending, and this was a reward which was paid *as a premium* on the 'risk-free' rate of interest. Later, in Chapter 11, we shall see that the prices of financial assets change in response, naturally enough, to changes in demand and supply. But we have already seen that the price that people are prepared to pay is determined by the rate of return that they require from an asset, and this is determined partly by the risk-free rate of interest.

In this chapter, therefore, we want to begin to explain how interest rates are determined. We start with the determination of the *short-term, risk-free, nominal rate of interest*. In the next chapter we go on to look at how a whole range of other interest rates, differentiated by term and by risk, are derived from the short-term, risk-free rate. One way of visualizing this two-stage process is to think that we are first going to examine the base or foundation level of interest rates, before going on to look at the superstructure built upon that base.

## 9.2 Interest rates defined and classified

The rate of interest is a payment from borrowers to lenders which compensates the latter for parting with funds for a period of time and at some risk. Put into real terms, it is often said that lenders are being

encouraged to forgo consumption now, in conditions of comparative certainty, in return for consumption later, in an uncertain future. This is a little misleading. In 'rewarding' savers for parting with funds, a rate of interest is, strictly speaking, rewarding savers for giving up the *ability to consume* if they should change their mind about saving. After all, there is a perfectly rational case to be made for people to save (forgo *actual consumption*) at zero, or even negative, real interest rates since they will wish to provide for old age or other future periods of zero income.

Notice that the effect of interest rates is to influence behaviour which stretches over a period of time – lending *for a period*, forgoing the ability to consume *for a period*, investing in capital goods which yield a return *over a period*. The relevant concept of interest rate is thus, strictly speaking, the *expected* rate. However, we can only observe actual interest rates. Unless we state otherwise, we shall assume that expected and actual rates turn out to be the same.

**Nominal interest rates** are the rates of interest that are actually paid, in money form. They are the interest rates that we use in everyday discussion and which we see quoted in advertisements, in the media and in official announcements. It is useful to think of nominal rates as consisting of four elements. Letting  $i$  stand for the nominal rate of interest, then:

$$i = r + \pi + l + \sigma \quad (9.1)$$

where  $r$  is the *real* short-term rate of interest,  $\pi$  is an *inflation* premium,  $l$  is a *liquidity* premium, and  $\sigma$  is a premium for risk.

The **real rate of interest** is the return that lenders require even if there is no risk and prices are constant. This is the 'pure' return for giving up the ability to spend, for even the shortest period of time. It is generally accepted that lenders prefer to lend for the shortest possible period. If this is the case, then long-term (real) interest rates will be higher than short-term ones and the difference might be described as a liquidity premium. If it is true that lenders require increasing inducements to part with liquidity for increasingly long periods then the inducements must be real (unless we assume that lenders suffer from 'money illusion'). Thus lenders will require compensation for any rise in prices that they expect to occur over the duration of the loan. Lastly,  $\sigma$  is a further premium required to compensate for whatever level of risk is perceived to attach to the loan. As we saw in the last chapter, the size of this premium in any specific case

will depend upon the riskiness of the loan in question in relation to ‘average risk’ in the market and the price required to compensate lenders for average risk. Of the four components making up the nominal rate,  $\sigma$  is not related to time.

Through Sections 3.3 to 3.5, we shall concentrate upon the determination of the risk-free, short-term nominal rate of interest. That is, we shall concentrate upon  $i$ , where  $i$  is composed of the two elements  $r$  and  $\pi$ . We shall use  $l$  and  $\sigma$  in the next chapter to explain the structure of interest rates built upon the short-term, risk-free rate.

### 9.3 ‘Market’ theories of interest rate determination

Many economics textbooks present two apparently conflicting accounts of the determination of interest rates. (Some do it perhaps even without realizing it. The **loanable funds theory** (*LFT*) is the basis of interest rates in the microeconomic section while **liquidity preference theory** (*LPT*) is called on in the macroeconomic chapters.) *LFT* is associated with the ‘classical’ economists of the nineteenth and early twentieth centuries while *LPT* is a product of John Maynard Keynes’ *General Theory of Employment, Interest and Money* (1936). The merits of the two approaches were the subject of a long and often bitter dispute between Keynes and his pupil (later colleague) D H Robertson.

#### 9.3.1 Loanable funds theory

Briefly, *LFT* explained the level of interest rates as the outcome of decisions to invest and decisions to save. Decisions to invest resulted from the desire to enjoy the future output from capital assets while decisions to save resulted from a desire to accumulate wealth for the future through the rate of interest offered by investors. The essential point, from an economic point of view, was that the rate of interest was freely determined by the interaction of these two sets of decisions. At the going rate of interest, any decision to save (not spend) must be matched by a decision to spend on capital goods. If, for some reason, savers decided to save more, then the excess supply of saving would push interest rates down, and investment up, until a

new equilibrium was reached at which saving and investment were equal. There could be no ‘leakage’ from the circular flow of income. In *LFT*, it is often said, the rate of interest is determined by the ‘real’ forces of *productivity* (of capital equipment, determining what borrowers could pay) and *thrift* (on the part of savers, determining their willingness to lend).

As we shall see in Section 9.3.2, this explanation of interest rates was attacked by Keynes in *The General Theory of Employment, Interest and Money*. Before attacking it, he labelled the theory a product of ‘classical’ economists, though he also pointed out that it had never been very clearly stated. (It might be noted in passing that Keynes was never very clear as to whom exactly he included under the heading of ‘classical’ economists.) The label undoubtedly comes from the fact that the theory makes a number of assumptions that are common in the approach of Ricardo and Mill and, indeed, in the work of more recent economists who claim to have revived the classical tradition. The assumptions of loanable funds theory are:

- the economy is operating at full employment;
- prices are constant;
- there is a fixed supply of money;
- there is perfect information.

From a borrowing and lending point of view, the significance of these assumptions is as follows. With output fixed at full employment there are no fluctuations in income or employment and therefore no fluctuations in the supply of saving resulting from this source. There is no fluctuation either in the demand for money as a result of varying levels of transactions in the economy. With the money supply fixed, there is no alternative source of funds but savings out of current income. No new money is being created which might meet part of the demand for funds. If there is perfect information, there is no uncertainty. There will be no fluctuation in the demand for funds resulting, for example, from shifts in the demand for money as a safe haven for savings. There will be no fluctuation in ‘hoards’. All savings will be made available in loanable form in order to benefit from the rate of interest. With no fluctuation in demand for hoards, the only source of demand for loanable funds comes from a desire to invest. Loanable funds theory is an explanation of how interest rates would be determined in an economy in long-run full equilibrium.

The effect of these assumptions is to ensure that the only supply of funds is saving, while the only demand comes from investment and the only influence on either is the rate of interest. We shall now look at *LFT* in more detail, remembering that *LFT* originally assumed constant prices. In these circumstances, the real and nominal rates of interest are identical. An explanation of the real rate is also an explanation of the nominal rate.

### The real rate of interest

It is assumed that agents prefer consumption now to consumption in the future, that is to say that they have *positive time preference*. The real rate of interest is the rate of interest that lenders would need to compensate them for postponing consumption until some point in the future, given constant prices. The size of the inducement necessary to bring about the postponement is thus said to measure their **rate of time preference**. Individuals will differ in their rates of time preference, in the way that individual 'tastes' vary towards all activities, but as a general rule we might expect the rate of time preference to fall with increases in income. People with large incomes will find it easier, and more attractive, to postpone consumption now – in order to enjoy a more prosperous old age, for example – than people with incomes scarcely large enough to purchase day-to-day essentials. In the aggregate, therefore, we would expect high-income communities to have a lower rate of time preference and this is just another way of saying that, other things being equal, we would expect saving to increase (as a proportion of income) with increases in income.

As described in the last paragraph, therefore, the real rate of interest can thus be seen as an inducement to *savers*. On the other hand borrowers, or users of those funds, are normally assumed to want them for investment in assets which yield a future stream either of income or of services or of output.

Consider for a moment the purchase of real assets such as plant or machinery. Borrowers will purchase such assets if they have a positive *net present value*. That is to say that the assets will be attractive if they yield some net benefit in excess of their purchase price, running costs and the cost of borrowed funds. Formally:

$$NPV = -P + \sum_{t=1}^n \frac{CF_t}{(1 + \bar{K})^t} \tag{9.2}$$

where *CF* is the cashflow (net of any running costs) in each period, *t*, and  $\bar{K}$  is the required rate of return. The required rate of return on a project must obviously cover the cost of funds and this will mean matching the risk-free short-term rate of interest plus the various risk premiums that lenders require. Any project that achieves this while leaving  $NPV \geq 0$  will justify borrowing the funds to undertake it. Clearly, from Equation 9.2, the ability of a project to fulfil this condition for any value of  $\bar{K}$  will depend upon its cashflows, that is to say upon its **productivity**. The greater the productivity of the asset, the higher the value at which  $\bar{K}$  can be set without breaching the condition of a positive *NPV*. Thus, an investor's ability to pay any given price for funds will depend upon the productivity of the real assets. We shall see later, but especially in Chapter 11, that the return on financial assets should also, in theory, reflect the return on the underlying real assets. If we accept this for the time being, then we can see that the demand for funds, that is to say the price that borrowers will be prepared to pay, will depend upon the productivity of real assets.

According to this point of view, therefore, the equilibrium real rate of interest will be that rate at which the supply of funds from savers just matches the quantity demanded by investors. Figure 9.1 illustrates this situation. The supply curve of funds, *S*, is drawn upward-sloping because of its savings component

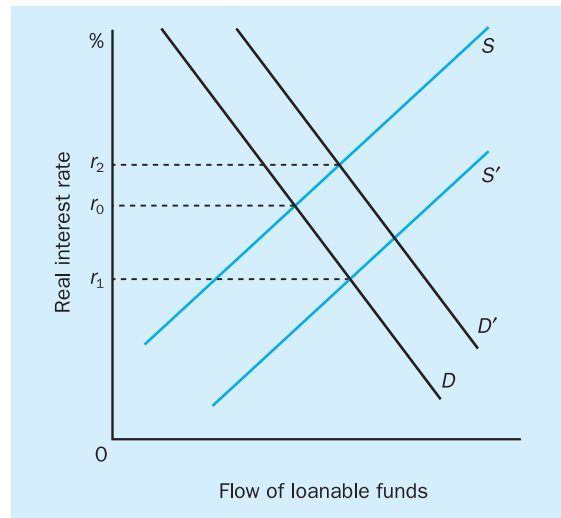


Figure 9.1 Loanable funds theory of the real rate of interest

reflecting the fact that the higher the rate of interest the greater the number of people who will find that it exceeds their rate of time preference. The demand curve,  $D$ , is drawn downward-sloping, indicating that the lower the rate of interest the more projects can be found whose productivity generates a positive  $NPV$ . The equilibrium real interest rate is that at which the supply of funds is just equal to the demand,  $r_0$ .

Imagine now that the community's rate of time preference diminishes and the supply of lending increases at all rates of interest. This is shown by a downward shift of the supply curve to  $S'$ . There is now an excess supply of lending – the number of profitable projects at any rate being unchanged. In the circumstances, the interest rate falls to  $r_1$ , more projects become profitable and the flow of lending and borrowing would be again in equilibrium.

Imagine now that, instead, there had been an increase in productivity. At  $r_0$  there would be an excess of profitable projects. The demand curve shifts to  $D'$ . Competition for funds would push up the rate of interest. More potential lenders would find that the rate of interest exceeded their rate of time preference, more funds would be forthcoming and a new equilibrium would emerge at  $r_2$ .

### The rate of inflation

We have just seen that the traditional explanation for a rate of interest payable to lenders by borrowers is that lenders are forgoing consumption for which they require compensation. Depending on their rate of time preference they may, for example, be willing to forego £100's-worth of current consumption provided that they are in a position to consume £105's-worth in one year's time. If this is the case, then the real rate of interest,  $r$ , is 5 per cent:

$$r = \frac{\pounds 105}{\pounds 100} - 1 = 0.05 = 5\% \quad (9.3)$$

If prices are constant, a 5 per cent return on £100 requires a cashflow in one year's time of £105.

$$CF_{t+1} = \pounds 100 \times (1 + r) \quad (9.4)$$

With constant prices, a 5 per cent real return is achieved with a nominal rate of interest,  $i$ , of 5 per cent. The real and nominal rates are the same and we can write the required augmentation in terms of either the real or nominal rate of interest, that is:

$$(1 + i) = (1 + r) \quad (9.5)$$

Given the experience of inflationary episodes throughout Europe in the twentieth century, the assumption of constant prices strikes us today as hopelessly unrealistic and might lead us to view loanable funds theory with scepticism. But it is not difficult to graft on to *LFT* an account of the determination of *nominal* interest rates under conditions of inflation. This explanation simply amounts to saying that nominal rates will differ from real rates by an amount necessary to compensate savers for rising prices and to ensure that borrowers do not benefit from them.

For example, suppose that prices are expected to rise by 8 per cent over the same period. (Notice again that it is the *expected* (or *ex ante*) rate of inflation that strictly matters.) Unless our lender suffers from money illusion, s/he will now require the future cashflow to be adjusted for the rise in the price level. The required cashflow in one year's time,  $CF_{t+1}$ , will be:

$$CF_{t+1} = \pounds 100 \times (1 + r) \times (1 + \pi^e) \quad (9.6)$$

where  $\pi^e$  is the expected rate of inflation. The required augmentation is now  $(1 + r) \times (1 + \pi^e)$  and this must be reflected in the nominal interest rate. Thus when prices are rising:

$$(1 + i) = (1 + r) \times (1 + \pi^e) \quad (9.7)$$

and the formula for the nominal rate becomes:

$$i = (1 + r) \times (1 + \pi^e) - 1 \quad (9.8)$$

#### Exercise 9.1 Real and nominal interest rates

Given the nominal rate of interest,  $i$ , and the expected rate of inflation,  $\pi^e$ , we can find the real rate,  $r$ , by rearranging Equation 9.8. Thus:

$$r = [(1 + i) / (1 + \pi^e)] - 1$$

But for low rates of interest and inflation we could rearrange the simpler expression, Equation 9.13:

$$r = i - \pi^e$$

- 1 Use each of these expressions to find the real rate of interest when nominal interest rates are 8% (= 0.08) and the expected rate of inflation is 4% (= 0.04).
- 2 Repeat the exercise setting the nominal rate to 20% and inflation to 15%.
- 3 Observe the difference between the two methods in each case.

Notice that the expression  $(1 + r) \times (1 + \pi^e)$  can be expanded as follows:

$$(1 + r) \times (1 + \pi^e) = 1 + r + \pi^e + (r)(\pi^e) \quad (9.9)$$

For modest rates of interest and inflation, the cross-product  $(r)(\pi^e)$  is very small and can be ignored. In these circumstances, our outlay has to increase by:

$$1 + r + \pi^e \quad (9.10)$$

In our example, the cashflow required in one year's time can now be found:

$$\begin{aligned} CF_{t+1} &= \pounds 100 \times (1 + r + \pi^e) \\ &= \pounds 100 \times (1 + 0.05 + 0.08) = \pounds 113 \end{aligned} \quad (9.11)$$

and the nominal rate of interest can be found (from Equation 9.3) by:

$$i = \frac{\pounds 113}{\pounds 100} - 1 = 0.13 = 13\% \quad (9.12)$$

At 'normal' rates of inflation and real interest rates, therefore, we can say that the required nominal rate of interest is approximately equal to the real rate plus the expected inflation rate:

$$i \approx r + \pi^e \quad (9.13)$$

Equation 9.13 is the equation for the short-term, risk-free, nominal rate of interest. If we replace  $\pi^e$  with  $\pi$  then Equation 9.14 is directly comparable with the first part of Equation 9.1.

$$i \approx r + \pi \quad (9.14)$$

### The Fisher effect

By rearranging Equation 9.13, we can see that the real rate of interest is the difference between the nominal rate and the expected (*ex ante*) rate of inflation.

$$r \approx i - \pi^e \quad (9.15)$$

Furthermore, unless they suffer from money illusion, it is the real rate of interest which will matter to the decisions of lenders and borrowers. Unfortunately, we cannot observe the real rate directly since we cannot observe lenders' and borrowers' *expectations*. The only way around this problem, unless we engage in large-scale surveys of what agents expect, is to assume that what they expect generally turns out to be the case. If we do this, then it means that we can subtract the *actual* or realized rate of inflation (which, of course, we can observe after the event) from the nominal rate of interest which we can also observe.

This gives us an *ex post* measure of real interest rates by rearranging Equation 9.14:

$$r \approx i - \pi \quad (9.16)$$

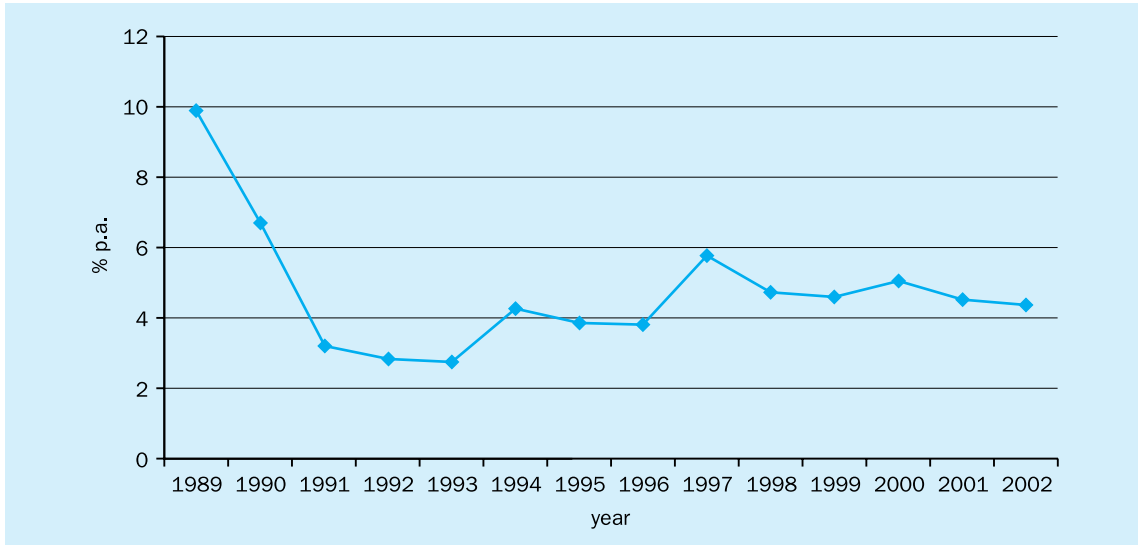
Equation 9.13 (sometimes written as Equation 9.14) is often known as the **Fisher equation**, after Irving Fisher whose book, *Theories of Interest* (1930), provided the first systematic discussion of the relation between real and nominal rates. In fact, Fisher is often credited with the argument that the real rate of interest tends to be stable over long periods. This, after all, is plausible given the explanation of the real rate as the result of time preference and capital productivity. There is no reason to suppose that either of these would be subject to violent short-term fluctuations. The argument then went on to explain variations in the nominal rate as the result of changes in the expected rate of inflation. In actual fact, although Fisher does advance this suggestion as worthy of consideration, he himself recognized that the nominal rate of interest did not follow the rate of inflation very closely and much of the book is taken up with explanations of why such an obviously plausible theoretical idea was not strongly confirmed in practice. In spite of this, the proposition that the nominal rate of interest is made up of a stable real rate and a premium which closely follows the rate of inflation has become known as the **Fisher effect**.

Figure 9.2 shows the recent behaviour of the UK (*ex post*) real interest rate calculated by subtracting realized inflation from the interest rate on three-month certificates of deposit. Clearly, there have been significant fluctuations.

These fluctuations in the real rate do not necessarily disprove entirely the Fisher hypothesis that the nominal rate consists of a stable desired real rate plus a premium for expected inflation. It could be true that people's expectations of inflation are responsible for the nominal rate but that these expectations are frequently wrong. It is worth recalling, however, that in the world of loanable funds theory, from which the Fisher hypothesis developed, perfect information was assumed.

Because of its origin in the work of 'classical' economists in the nineteenth century, **loanable funds theory** is often regarded as the 'traditional view' of interest rate determination. We can sum it up as follows:

- the short-term, risk-free real rate of interest is the sum paid by borrowers to lenders for the shortest possible period, in a world of constant prices and zero risk;



**Figure 9.2** UK real interest rates, 1989–2002

Source: From [www.nationalstatistics.gov.uk](http://www.nationalstatistics.gov.uk), series CZBH. Crown copyright material is reproduced with the permission of the Controller of HMSO and the Queen's Printer for Scotland.

- the supply of funds is determined by people's willingness to save and this depends in turn upon their rate of time preference;
- the demand for funds depends upon the prospects for their profitable use and this depends in turn upon the productivity of the assets which such funds will be used to purchase;
- the short-term, risk-free, nominal rate of interest is composed of a real rate determined by time preference and productivity plus a premium which reflects the expected rate of inflation.

### 9.3.2 Liquidity preference theory

Keynes' attack upon loanable funds theory comes mainly in Chapters 13–17 of his *General Theory of Employment, Interest and Money*.

Firstly, he argued, people's ability to save depended very much upon their level of income. Since he rejected the assumption of full employment it followed that *aggregate* income could fluctuate quite widely. In communities where income was well above subsistence level, it made sense to save even when interest was zero. (In Figure 9.1, therefore, the supply curve would intercept the horizontal axis and would need to be redrawn every time income changed.) The rate of

interest played a secondary role by influencing *how* people decided to save. Interest was a reward for lending or parting with money and this was not necessarily the same thing as saving. After all, one could save (that is, not spend) by accumulating notes and coin and keeping them under the bed. (We first saw this in Section 1.1.) No interest would be payable then, even though saving would be taking place. If lots of people wished to hold idle money balances in this way, money would be scarce, and interest rates high even though saving would also be at a high level. These are both points which we touched on in Section 9.2: *saving* may not depend upon interest rates, *lending* very likely does.

Because of his emphasis upon interest as the inducement to part with liquidity ('the ability to change one's mind', as we said in Section 9.2), Keynes chose to explain interest as the result of an interaction between the supply of money and the demand for money. We shall come back to the question of money supply and demand in Chapters 12 and 13, but to understand Keynes' argument and its implications, it is worth glancing at Figure 9.3.

The money supply is assumed to be fixed (by the actions of the central bank) and this is shown by the vertical curve,  $M_s$ . The demand curve,  $M_D$ , is drawn downward-sloping. One might explain the negative slope by reference to 'opportunity cost'. If we assume

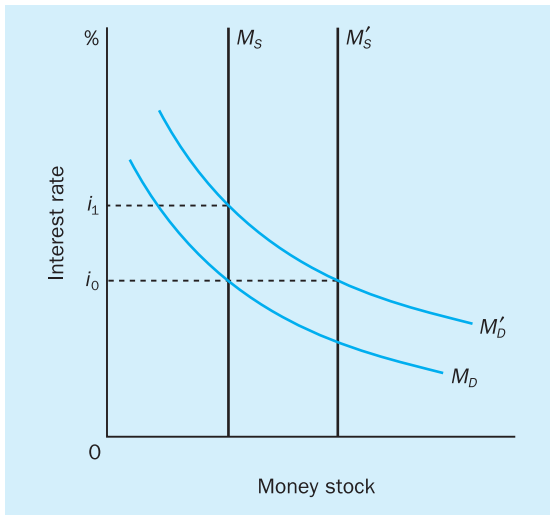
**Box 9.1 Interest rates and asset prices**

A fundamental principle of economics and finance is that the value of an asset lies in the stream of income or services or other benefits that it produces. In the case of financial assets, the benefit is usually an income stream or 'cashflow'. In order to arrive at a valuation the payments in this income stream have to be discounted – that is to say that the value of the more distant payments has to be adjusted downward to take account of the fact that we have to wait for them.

This is what we saw in Equation 9.2. It shows a cashflow as a series of payments identified as  $CF_t$ , where  $t$  indicates the time of their receipt. The value of the series is found by discounting each payment by  $(1 + \bar{K})^t$ , where  $\bar{K}$  is the rate of return that we require and  $t$  again denotes the period in which the payment is received. One can see immediately that a payment ( $CF$ ) which lies a long way ahead (that is, has a high  $t$  value) will be heavily discounted. This is because the corresponding denominator will have a high  $t$  value and will be raised to 'the power of  $t$ '.

But, more importantly, notice what happens if we change the value of  $\bar{K}$ . This also appears in the denominator. If we make it larger, the value of each  $CF$  is made smaller. Thus, when we sum the series of discounted  $CF$ s their value will be lower, the larger is the magnitude of  $\bar{K}$ . All we need to remember now is that since  $\bar{K}$  is the rate of return that we require, it must reflect the level of returns that are available elsewhere. That is, *it must reflect the going rate of interest*. If interest rates go up,  $\bar{K}$  increases and the value of our asset goes down. If interest rates go down,  $\bar{K}$  goes down and the value of our asset goes up.

There are numerical examples of changes in interest rates causing changes in asset prices in Sections 10.2 and 11.3.



**Figure 9.3** Money market equilibrium – the effect of demand shifts

that money (= cash + bank sight deposits) does not pay interest then at lower interest rates money's attractions as a perfectly liquid asset are greater than they would be when interest rates on alternative assets are high. Keynes' explanation, however, drew upon interesting psychological factors. When interest rates are low, people would expect the next movement to be upward. When interest rates rise, asset prices fall

(Box 9.1 contains an illustration) and holders of assets suffer a capital loss. Thus, at low interest rates money avoids the risk of capital loss. The *position* of the curve depends upon people's need for money in exchange and this in turn depends upon the price level and the level of economic activity. Thus any change in nominal aggregate income causes the curve to shift.

One of the most important of Keynes' insights was to introduce expectations and uncertainty and thus to create a role for money as a safe haven in a treacherous world. We have seen that the downward slope of the curve arises from the increasing strength of *expectation*, when interest rates are low, that a capital loss may be just around the corner. But expectations of interest rate changes are not tied to absolute levels of actual rates. What may look like a low rate (set to rise) in one situation may look 'normal' in another. Thus at any actual rate, circumstances may change so as to cause expectations to change. The current rate, acceptable today, may look too low tomorrow. There will be a rush for money. At today's rate, the demand for money tomorrow may be much greater. Thus, introducing expectations in this way introduces the possibility that the demand curve may shift around. As a rule, anything that increases uncertainty tends to increase the attraction of money. The demand curve shifts upward (to  $M'_D$ ) and the rush to liquidity pushes up interest rates, from  $i_0$  to  $i_1$ . If the money supply were to expand, to  $M'_S$  for



example, the comparative shortage would be eliminated and the rate of interest would remain at  $i_0$ .

The significance of all this for Keynes' wider project was first of all that the rate of interest was no longer free to accommodate the flow of saving to the flow of investment. There could, for example, be leakages from the circular flow of income and spending leading to a fall in output and employment. Secondly, the possibility that the demand for money might be unstable meant that nominal interest rates (and therefore real interest rates) might fluctuate in response to psychological factors, causing instability in the real economy.

We can sum up the liquidity preference approach as follows:

- agents' actions determine *nominal* interest rates. Real rates will depend upon the behaviour of prices and the extent to which price changes are correctly anticipated;
- the nominal rate is determined by the demand for money relative to its supply;
- the demand for money depends upon the price level and upon the level of economic activity but it also depends upon the desire to hold money as a safe asset in an uncertain world;
- the degree of uncertainty that agents feel is highly variable, leading to fluctuations in the demand for money and hence in the nominal rate of interest;
- the supply of money is independent of the demand for it and is assumed to be fixed by the actions of the monetary authorities.

### 9.3.3 The determination of interest rates: an eclectic approach

Considered alone, neither the *LPT* nor *LFT* is entirely satisfactory. Loanable funds theory is appropriate for a perfectly static setting with output fixed at its full employment level, prices constant, a fixed money supply and perfect information. As we said, in those circumstances there would be no fluctuations in the demand for hoards, savers would lend all that they saved and the only demand for funds would be for investment. We could then say that the real rate of

interest paid between borrowers and lenders would be determined by time preference (for savers) and the productivity of capital (for borrowers).

In economies as we know them, however, this is too simple. Interest is paid not just as an inducement to save but as an inducement to *lend money*, and saving does not necessarily entail lending. Our savers would not earn interest, for example, if they simply accumulated notes and coin or some types of bank deposits. They have to be willing to *lend* the funds that become available from saving; and fluctuations in the demand for money (or 'hoards' in classical language) are perfectly reasonable in economies where output not only grows but fluctuates in its rate of growth and where uncertainty about the future makes occasional 'rushes to cash' entirely rational. Furthermore, in economies as we know them, saving is not the only potential source of funds. Banks are in business to lend and the normal result is a money supply where deposits are expanding as a result of this lending.

We need to take account of both complications and our suggestion is that we do this by thinking of 'new money' as an additional source of funds and of 'hoarding' as an additional demand. We begin with the former.

The supply of funds available to borrowers consists of both the funds that savers are prepared to lend *plus* any increase in the community's total stock of money. We shall see in Chapter 12 that the money supply expands when banks lend, since their lending creates deposits. Furthermore, this additional lending need not entail rising interest rates if employment is below the full employment level. Provided the central bank is prepared to provide banks with the necessary reserves at the going rate of interest, lending (and deposits) may expand for so long as banks can find willing (and credit-worthy) borrowers. Whether we focus upon the bank loans or upon the bank deposits that they create, bank lending is an additional source of funds.

Our second complication, recall, is that savers may not wish to lend all that they save. In certain circumstances, they may wish to accumulate funds themselves, usually in the form of bank deposits. Adding to holdings of money is sometimes called additional 'hoarding' or adding to 'idle balances'.<sup>1</sup> Both the potential supply of new money and the possibility that more money may

<sup>1</sup> Take care not to think that the decision to accumulate bank deposits makes it possible for banks to lend more and thus to replace the lending that savers have decided not to do. The decision to accumulate deposits does not increase their quantity. If savers had decided to lend (by buying bonds, for example) the deposits would still have been in the banks and they would still have been matched by bank loans. But they would have been owned by borrowers and lending would have been equal to the bank loans *plus* the bond issue.

be demanded for hoards are additional influences on the supply and demand for funds which we must add to the traditional account which focuses only upon the actions of savers and investors.

Looking at the supply side, we can now say that the quantity of funds available to borrowers is:

$$savings - \Delta hoards + \Delta new\ money$$

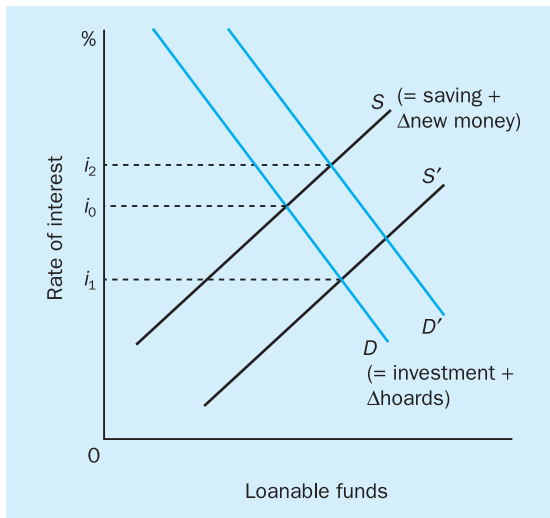
and the equilibrium condition will be that in which:

$$savings - \Delta hoards + \Delta new\ money = investment$$

In practice, this condition is often rearranged to show sources of funds on one side and uses of funds on the other, thus:

$$savings + \Delta new\ money = investment + \Delta hoards$$

Figure 9.4 is a modification of Figure 9.1 and shows the effect of incorporating these complications. The supply curve, *S*, is now labelled to make it clear that the potential supply of funds consists of both saving from income and also any addition to the money stock. It is drawn upward-sloping still because of the savings component which is assumed still to respond to interest rates. The demand curve, *D*, is drawn downward-sloping reflecting still the demand for funds for investment in real capital assets. More of these assets, as we said before, will have a positive NPV the lower is the rate of interest, but the curve also contains a demand for 'idle balances' which causes it to lie further to the right (and may cause it to be unstable).



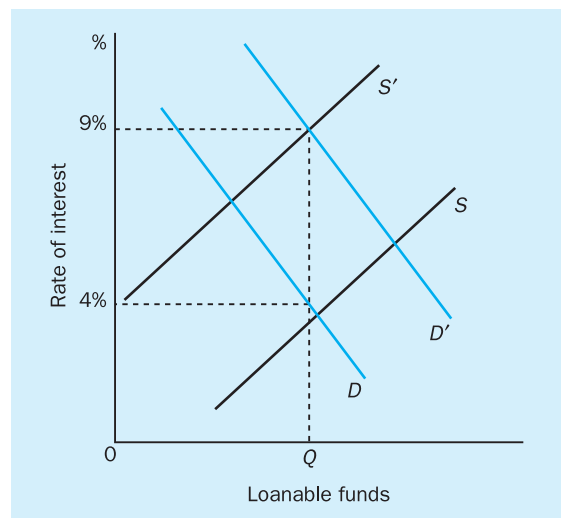
**Figure 9.4** Loanable funds and liquidity preference theories combined

*S* = saving +  $\Delta$ new money; *D* = investment +  $\Delta$ hoards.

In Figure 9.4 an increase in income, a decrease in time preference or an increase in the supply of new money each increases the availability of funds and causes the equilibrium rate of interest to fall, from  $i_0$  to, say,  $i_1$ . Reversing the disturbance causes the curve to shift upward. On the demand side, an increase in productivity of capital assets or an increase in the demand for money causes the curve to shift outward and, starting from  $i_0$ , the equilibrium rate of interest will rise, say to  $i_2$ .

Notice that this account allows for a certain amount of flexibility in the relationship between real and nominal rates, at least in the short run. Imagine, for example, a monetary expansion which increases the supply of funds relative to the demand. In Figure 9.3 the supply curve shifts down and the nominal rate falls. More investment is undertaken and, without the classical assumption of full employment, output and employment will expand. With spare capacity, output may rise, again in the short run, with little, if any, effect on inflation. The new nominal rate now lies below the old nominal rate and, if inflation remains unaffected, the new *real* rate lies below the old real rate.

Under the classical assumptions of loanable funds theory this outcome would be impossible. Starting from full employment and constant prices, an expansion in the supply of new money would initiate an increase in spending and prices would rise, producing an increase in the rate of inflation from zero to, say, 5 per cent. Figure 9.5 shows what would happen from a classical perspective.



**Figure 9.5** The effect of inflation in 'classical' theory

*S* = saving +  $\Delta$ new money; *D* = investment +  $\Delta$ hoards.

We begin with an equilibrium real rate of interest of 4 per cent which, given constant prices, is also the current nominal rate. A monetary expansion, however, causes inflation of 5 per cent and this is recognized accurately and equally by both borrowers and lenders. With inflation at 5 per cent, lenders demand 9 per cent for the current level of lending and the supply curve shifts upward. On the other hand, borrowers know that at 9 per cent they are paying a real rate of only 4 per cent. The demand curve also shifts upward. Notice two things. Firstly, that they both shift by the exact amount necessary to maintain the same levels of borrowing and lending. ('Real' behaviour is unchanged.) Secondly, the nominal rate is equal to the real rate plus an accurately anticipated inflation premium. In these circumstances, the Fisher hypothesis would be vindicated.

#### 9.4 The role of central banks – 'administered' interest rates

The account that we have so far given of how short-term interest rates are determined stresses the role of private decision makers or what might be called 'market forces'. We have mentioned the monetary authorities, in the guise of the central bank, only once in saying that commercial banks can add to funds by creating money and that this need not involve a rise in interest rates if the central bank supplies the necessary reserves at a constant price.

However, to any student who keeps even a casual eye on current affairs this must seem odd. Scarcely a month goes by in any economy without the news-media reporting either that the monetary authorities have raised (or lowered) the level of official short-term rates or that financial markets are speculating that the authorities are about to do so. Box 9.2 shows a selection of typical recent headlines from newspapers doing just that.

If it is the case that short-term nominal interest rates are set by administrative decision then all the earlier discussion of this chapter is redundant. (If, on the other hand, interest rates are indeed set by market forces, then the currently fashionable argument that central banks should have more independence in their ability to set interest rates becomes pointless.) In this section, therefore, we devote our attention to

the influence that central banks, acting on behalf of or independently from their governments, can exert over interest rates. We begin by looking at sources of influence and then go on to consider the constraints and limitations to this influence. But before we do, let us clearly distinguish the terms 'short term' and 'short run'. Throughout this chapter, our emphasis has been upon short-term interest rates. These, we know, are interest rates which apply to loans for short periods or short terms. In the rest of this section we shall suggest that these short-term rates may be influenced by central bank behaviour for short periods of time, that is to say in the short run. If this influence cannot be exerted over a long period of time, however, then we have to say that short-term rates are market-determined in the long run. This lesson will be useful in future. We often need to distinguish between the behaviour of short-term (or medium-term or long-term) instruments over a short period of time (the short run) or a medium or long period (the medium run and long run respectively).

The ability of all central banks to exercise any influence over interest rates lies in their role as **lenders of last resort**. This in turn relies upon their role as

#### More from the web The setting of interest rates

All the major central banks publish detailed information about their latest interest rate decisions and the reasons for them. (This is part of the trend towards 'transparency' in policy-making which we discuss in Section 14.7). For example, the Bank of England and the European Central Bank both highlight the current official rate(s) on their home pages.

From the Bank of England's home page there is a link to the minutes of the latest meeting of the Monetary Policy Committee which is responsible for the decision. From the ECB's home page you can go to 'Press Releases' where you will find a press release stating the latest decision with a link to the 'Press Conference' which is held shortly after the announcement. Both the MPC's minutes and the ECB's minutes shed useful light on how the respective banks came to their latest decisions. The ECB's website is at [www.ECB.int](http://www.ECB.int) The Bank of England is at [www.bankofengland.co.uk](http://www.bankofengland.co.uk)

## Box 9.2 Central banks and interest rates



## MARKETS REPORT

## Fed raises US interest rates by 50 basis points

*Financial Times, 2.2.95*

## MIXED SIGNALS

## ECB puzzles markets by leaving rates unchanged

By Tony Major in Frankfurt

Jean Claude Trichet, the recently-appointed European Central Bank president, confused markets yesterday by playing down the chances of an interest rate cut in the coming months. Just a week earlier he had hinted at a monetary easing.

The mixed signals from the ECB, which held its base interest rate steady at 2 per cent for the tenth month running, cast renewed doubt on the clarity of the bank's policy pronouncements.

*Financial Times, 2 April 2004*

## George repeats call for interest rate rise

By Graham Bowley and Robert Chote

Mr Eddie George, governor of the Bank of England, yesterday insisted that interest rates should rise again soon, rejecting the chancellor's argument that the strength of the pound makes it unnecessary.

His remarks, in a speech to bankers in Edinburgh, are likely to inflame the debate over interest rates between the Bank and Mr Kenneth Clark in the run-up to the election.

*Financial Times, 21.1.97*

## MPC man hints at series of rises in interest rates

By Scheherazade Daneshkhu in London and Sundeep Tucker in Edinburgh

Interest rates could rise soon and might need to go further than expectations, a member of the Bank of England's interest rate-setting monetary policy committee signalled yesterday.

Speaking two days after the Budget, which was short on tax rises or measures to cool the housing market, Paul Tucker, the Bank's executive director of markets, told an Edinburgh conference that the Bank of England's main interest rate of 4 per cent was stimulating the economy.

*Financial Times, 20 March 2004*

Warning that increase could worsen exporters' plight as sterling rises

## Hold interest rate, CBI says

*Financial Times, 22.1.97*

monopoly suppliers of liquidity in the event of a general shortage of funds. In most European countries, central banks developed this role in the second half of the nineteenth century or the early years of the twentieth. The need for a lender of last resort originated with the need to reassure depositors of the certain convertibility of their deposits into cash. In the early days of deposit banking when banks were numerous, small and local there was always the danger that a perfectly well-run and solvent bank could fail as a result of unexpected cash withdrawals or transfers to another bank. Indeed, in the earliest stages mere rumours of a cash shortage could be sufficient to bring about withdrawals and a failure which was quite unnecessary. Clearly the failure of one bank involves major hardship for its depositors but in the background loomed the nightmare that one failure might lead to more as depositors in sound banks panicked. Without a lender of last resort, the only solution would be for banks to hold very high levels of reserves (= cash + banks' deposits at the central bank). Since these reserves pay no interest, they act as a tax on banking activity and make bank intermediation more expensive and less efficient than it would otherwise be.

It is doubtful that many depositors these days give so much as a thought to the possibility that they will not be able to draw on their deposits whenever they feel like it. However, so long as full convertibility between deposits and cash is guaranteed, a lender of last resort is essential.<sup>2</sup> This requirement is reinforced where, as is generally the case, reserves pay no interest since banks then have an incentive to minimize holdings of such reserves. In some systems banks are required to observe a minimum *mandatory* reserve ratio, in which case they will be seeking to minimize holdings of additional, or what are sometimes called 'free', or 'excess', reserves. In cases where the minimum reserve ratio is a matter of choice (a *prudential* reserve ratio) there is no distinction between required and excess reserves.

The consequence of operating with minimum reserves is that banks can find themselves short of reserves at a particular moment for reasons that have

little to do with prudence or foolishness. In the UK, for example, the central government banks with the Bank of England, not with the commercial banks. A net payment of funds by the private sector to the central government, therefore, transfers deposits from commercial banks to the government's account at the Bank of England. This withdrawal (of liabilities) is matched on the asset side of the balance sheet by an equal transfer from commercial banks' reserves to the government's account at the Bank of England. Since reserves are only a very small proportion of deposits, this one-for-one reduction in deposits and reserves lowers the ratio dramatically.<sup>3</sup> Such private-public sector transfers are not easily predicted on a daily basis.

An individual bank in difficulty can, of course, remedy the position by borrowing in the interbank market. But in the event of a system-wide shortage of funds, the central bank becomes the monopoly supplier. The precise manner in which central banks operate to relieve shortages (or to mop up surpluses for that matter) varies between systems and reflects the differing histories and institutional arrangements in each system. Central bank relations with the commercial banking system is a theme in each of our earlier chapters on specific countries. However, it is worth noting that whatever the arrangements may be in detail, they fall into two broad categories. Either the central bank may *lend* funds for reserve purposes (often known as helping through the 'discount window') usually at a pre-announced rate of interest or it may *buy* short-dated non-reserve assets from banks at prices which may or may not be pre-announced.

The essential point here, however, is that the central bank is the monopoly supplier of funds and it can behave just like any other monopolist. It can either decide on the quantity of reserves to make available, and allow banks to bid between themselves for the available supply, or it can set the price and supply whatever quantity of reserves is required. In the former case, the quantity is fixed directly and the price follows; in the latter the price is fixed and the quantity demanded follows. Whichever it decides to do, its actions will determine short-term interest rates. This in turn sets a

<sup>2</sup> Not all would agree today. In the past few years there has been a revival of interest in 'free' banking in which market forces would force banks to behave in a way that would guarantee their stability. See the references to Dowd (1996), Benkston and Kaufman (1996) and Dow (1996) at the end of this chapter. Goodhart (1991) presents a fairly conventional case for the last resort role of central banks.

<sup>3</sup> For example, in a banking system running with a ratio of reserves to deposits of 1:10, a 5 per cent loss of deposits is matched by a 50 per cent loss of reserves and the reserve ratio is almost halved from 1:10 to 1:19. We look at banks, reserve ratios and the money supply in more detail in Section 12.4.

base to the level of interest rates since commercial banks will not engage in lending at rates which do not at least exceed the rate that they would have to pay for lender of last resort facilities. Deposit rates are then set at a discount to lending rates and arbitrage is assumed to keep bank and other short-term interest rates in line. Since banks are generally in the position of wanting to expand their loans and deposits, and because they are continually rolling-over previous borrowings, the central bank always has the power to set the price by one means or another. And it is movements in this price, whether it is known in different monetary systems as ‘base rate’, ‘refinancing rate’, ‘repo rate’, ‘minimum lending rate’, which are the subject of intense interest when commentators report that ‘the Bank has raised (or lowered) interest rates’.

On the face of it, we have here an account of interest rate determination which provides a much bigger contrast with our two ‘market’ theories than they do with each other. *If* the central bank is in a position to set short-term interest rates as a matter of administrative decision, then there is no need for elaborate theories about the level of interest rates.

As usual in economics, however, things are not quite so straightforward. Notice, firstly, that even if we accept the ‘administrative’ account unreservedly, we are only taking a view about the setting of *nominal* interest rates – the *real* rate will depend upon what happens to expectations about future inflation rates – and we only have an account of the setting of the shortest of short-term rates. (Most central banks would claim to set rates only in the overnight to seven-day range.) Nonetheless, we are still a long way from both loanable funds and liquidity preference. Can we establish firmly that either ‘market’ or ‘administrative’ accounts are superior? And if we cannot, then can we reconcile or combine them in some way? Since we observe central banks setting interest rates, telling us that they do so and telling us how they do it, it seems we have either to reject more market-based accounts or look for reconciliation. This may not be so difficult as it seems, because if we consider the central bank’s position in more detail we shall see that there are a number of constraints within which it must work and some of these are constraints posed by market forces.

Firstly, saying that central banks set interest rates (even very short-term nominal rates) does not mean that they are free to set these rates at whatever level they choose. Obviously, interest rates have to be set in

order to achieve a number of objectives. We are familiar these days with the idea that objectives may pose conflicting demands on instruments. Since 2001, for example, the USA, the Eurozone, and other countries including the UK have all had to face the dilemma of raising interest rates to protect weak currencies with the risk of ending a fragile recovery from recession.

Secondly, even where a single or overriding objective can be identified – these days it is usually a low rate of inflation – there may still be conflicting pressures on the interest rate instrument arising out of disagreement about which intermediate target to focus upon. For example, if inflation is the ultimate target, should the level of interest rates be chosen with a view to minimizing the rate of monetary growth, or to maintaining a high exchange rate?

Thirdly, when all these questions have been resolved, the setting of interest rates will often depend upon what is happening to interest rates elsewhere. For many European countries, the level of short-term interest rates is closely connected with rates available on sterling or dollar assets. For ‘open’ economies like that of the UK, changes in EMU or US rates inevitably trigger questions about the next movement in sterling rates. This happens because capital is internationally very mobile. Thus, quite slight differences in the profits to be gained from holding dollar rather than sterling assets, for example, cause savers to sell sterling assets and buy dollar ones. Since assets are normally bought and sold in the currency of their denomination, this means that sellers of sterling assets (who now hold sterling) must now sell sterling itself in order to buy dollars. If this continues for only a short time, the price of sterling (in other currencies) begins to fall. If, as is usual, governments have some desired exchange rate for the domestic currency, then domestic interest rates will have to rise.

Fourthly, and more directly relevant in the present context, it is virtually impossible for central banks to set interest rates that do not have the endorsement of financial markets. As we shall see in several later chapters, it is now possible for very large sums of money to be moved between financial centres at a moment’s notice and at very low cost. It is very difficult, therefore, for the authorities to impose a level of short-term rates which is regarded as inappropriate by financial markets. Indeed, it is not difficult to find cases where central bank preferences and market preferences appear to have conflicted and where this happens it is usually market sentiment that ultimately

triumphs. The experiences of Italy and the UK in being forced from the Exchange Rate Mechanism in September 1992 yield dramatic examples. One can say either that these incidents were demonstrations of the power of market sentiment when the countries concerned tried to maintain exchange rates (as opposed to interest rates) which markets thought unsustainable, or one can make the cases even more relevant by saying that the choice of exchange rate and interest rate were two sides of the same problem. *Given* their desire to maintain their ERM agreed exchange rates, the Bank of England and the Bank of Italy pushed up interest rates to emergency levels. But markets took the view that these interest rates were still not high enough given the exchange rate objective. Faced with the choice of yet higher interest rates or leaving the ERM, the central banks chose the latter course.

Fifthly, if central bank decisions about interest rates can be clearly seen to be influenced by market forces in some rather dramatic situations, we need to look carefully at their decisions in more everyday contexts. After all, outward appearances will be the same (a central bank will make an official announcement, the media will treat it as ‘news’) whether the central bank is issuing an independent instruction which it expects everyone else to follow, or is confirming a situation which market practitioners have come to regard already as inevitable. Careful study of the financial press, for example, often reveals rises in short money rates, and may even show developing market sentiment that interest rates must rise, in the few days immediately prior to an official announcement. Here, the central bank merely confirms what markets have already decided. And as central banks have concentrated in recent years on making their conduct of monetary policy more ‘transparent’ it has become even more difficult to tell whether markets are anticipating what the central bank is deciding or whether the central bank is confirming what the markets have already decided.

What all of this suggests is twofold. Firstly, central banks are certainly constrained in their ability to set interest rates and some of the most significant constraints are those imposed by markets’ beliefs about what interest rates *ought* to be. Secondly, while central bank behaviour is clearly visible, it will always be reported as news, while market activity is more complex and obscure and receives less media attention. We therefore need to be cautious about interpreting the correlation between central bank interest

rate statements and changes in interest rates as cause and effect.

### 9.5 A synthesis

The safest conclusion is that the setting of short-term nominal interest rates depends upon *both* market forces (which may be driven by some mixture of loanable funds and liquidity preference considerations of the kind we discussed in Section 9.3.3) *and* upon decisions by the monetary authorities. We might be able to make this vague conclusion a little more precise if we think of a ‘short-run/long-run’ distinction. We might want to say, for example, that for short periods the central bank has considerable power over the determination of short-term nominal rates (and if the economy is operating in a recession this may also yield an influence over real rates). For example, looking at Figure 9.6 (which is based on our earlier Figure 9.4) we might envisage a situation where the flow of funds and the demand for them is initially consistent with an interest rate of  $i_0$  and we might also assume that this is also the authorities’ target rate. Imagine now that market sentiment anticipates a rise in interest rates (perhaps because of weakness in the exchange rate). There is an increase in liquidity preference and in Figure 9.6 the demand for funds shifts out to  $D'$ ,

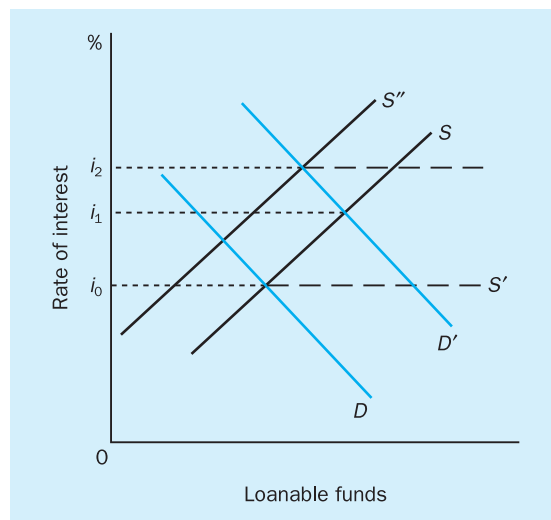


Figure 9.6 Interest rate determination – when the central bank has preferences

threatening to push interest rates up to  $i_1$ . If the central bank wishes to maintain interest rates at  $i_0$ , it can make it clear to banks that reserves will continue to be made available at the existing level of interest rates so that they can respond to the demand for funds without fear of a reserve shortage. Unlimited funds become available at the going rate and the supply curve effectively becomes horizontal, as shown by the broken line,  $S'$ .

In the longer term, however, which may only be as long as it takes for foreign exchange markets to realize what is happening, this policy may prove unsustainable. If continuous expansion of money and credit at the going level of interest rates is unacceptable in foreign exchange markets (perhaps because of its inflationary potential) then the pressure on the exchange rate will grow. The authorities are then faced with the familiar dilemma of conflict in objectives. Notice that the interest rate/exchange rate combination is unstable. Holding rates *given* at  $i_0$  (and expanding money and credit) threatens a continually *declining* exchange rate. If preserving the exchange rate triumphs, the authorities may not just have to 'put' interest rates up to  $i_1$  but may be forced to raise them further, say to  $i_2$ , by indicating that henceforth new reserves will be forthcoming only at a new, higher level of interest rates.

## 9.6 Summary

No one doubts that the behaviour of interest rates is important for both the real economy and for financial

markets. The traditional account of interest rate determination focuses upon the 'real' factors of productivity and time preference. These forces set the *real* rate of interest and the nominal rate will simply be the real rate plus an inflation premium. This account treats the act of saving as equivalent to making available 'loanable funds'. Clearly, this need not be the case, as Keynes pointed out. People may save without lending. Furthermore, the ability to save rests also upon a level of income (which was variable) and not just an interest incentive. Keynes' liquidity preference theory focused upon the desire to hold money in relation to the supply that was available. We suggested that these accounts could be combined if one recognized that both the demand for liquid wealth and banks' creation of new money by lending affected the supply of loanable funds.

Both of these accounts, however, focus upon market forces. Neither is immediately reconcilable with what we frequently observe which is that 'the authorities' announce and appear to decide upon interest rate changes. On the other hand, we know that central banks are often constrained by market sentiment in what they can do about interest rates. Therefore a sensible way of looking at interest rate determination is to recognize the fundamental role played by market forces but then also to recognize the influence of central banks in the short run, provided their decisions do not stray too far from market sentiment.

This interplay between the authorities and market participants determines the short-term, nominal, risk-free, rate of interest. For a given rate of inflation, this fixes also the short-term, *real*, risk-free rate.

### Key concepts in this chapter

Nominal interest rate	Productivity	Liquidity preference theory
Real interest rate	Thrift	Lender of last resort
Inflation premium	<i>Ex post</i>	Short term <i>vs</i> short run
Fisher effect	<i>Ex ante</i>	Short term <i>vs</i> long run
Hoards	Loanable funds	
Rate of time preference	Loanable fund theory	



## Questions and problems

- 1 Distinguish between nominal and real interest rates.
- 2 Using loanable funds theory, explain the likely effect on the supply of funds and the equilibrium interest rate of:
  - (a) an increased desire to save for old age;
  - (b) a reduction in taxes on income from savings.
- 3 Explain the Fisher hypothesis. What is the logic behind the idea that there should be a positive relationship between the rate of inflation and nominal interest rates?
- 4 What is meant by the terms *ex ante* and *ex post* as applied to real interest rates?
- 5 Use the loanable funds diagram to explain how you would expect an increase in inflationary expectations to affect:
  - (a) the supply and demand schedules;
  - (b) the nominal rate of interest;
  - (c) the *ex ante* real rate of interest.
- 6 Estimate the *ex post* real (short-term) interest rate over the past year. How does it compare with the nominal short-term rate?
- 7 Using liquidity preference theory, explain how you would expect the demand for money and the equilibrium rate of interest to be affected by:
  - (a) a growing anxiety that security prices might be about to fall;
  - (b) a growing belief that the central bank is about to tighten monetary policy?
- 8 Explain what central banks can do to prevent a rise in interest rates. What limits the central bank's ability to do this?
- 9 Using the financial press and/or official publications give a brief outline of the current policy on interest rates.

## Further reading

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[www.ecb.int](http://www.ecb.int)

[www.nationalstatistics.gov.uk](http://www.nationalstatistics.gov.uk)

## Chapter 10

# The structure of interest rates

*What you will learn in this chapter:*

- The meaning of risk and term premiums
- Why the ‘term’ or period to maturity of an asset affects its rate of return
- Why a term premium may still be required even if the asset is highly liquid
- Some of the forms that risk can take for borrowers and lenders
- Why risk affects the rate of return on an asset
- Why expected changes in interest rates can affect the current structure of rates
- How persistent borrowing by governments may (and may not) affect the structure of rates

## 10.1 Introduction

In the last chapter we saw that any nominal interest rate,  $i$ , could be seen as the sum of four components:

$$i = r + \pi + l + \sigma \quad (10.1)$$

where  $r$  is the real short-term rate of interest,  $\pi$  is an *inflation* premium,  $l$  is a *liquidity* premium, and  $\sigma$  is a premium for *risk*. We then concentrated upon the determination of the first two components in order to develop a theory of short-term nominal interest rates. But we know from everyday observation that any developed financial system is characterized by instruments offering a vast range of different interest rates (a range which expands again when we think about *rates of return*). This *range*, or *structure*, is the result of instruments offering facilities for borrowing and lending over different periods (or *terms*) and with differing degrees of *risk*.

We turn our attention in Section 10.2 to the way in which the term ( $l$ ) of a loan may affect the rate of interest and in Section 10.3 we shall look at how it may also be affected by risk ( $\sigma$ ). Together they give rise to a range of interest rate *differentials* or *spreads*. In Section 10.4 we shall look at two other factors which are often said to influence the structure of interest rates.

Remember, before we begin, that the rate of interest on any asset depends ultimately upon the supply and demand for that asset. The rate of interest on long-term loans therefore depends upon the willingness of lenders to lend long term compared with the desire of borrowers to borrow for long periods. Similarly, a premium on risky assets reflects the comparative unwillingness of holders to hold such assets. It is rather easy, when explaining differentials as the result of certain types of premiums, to start to think of these premiums as mark-ups which somehow have to be added ‘naturally’ or ‘automatically’. There is nothing natural or inevitable about them. They are created by people’s preferences. The market for loans considered as a whole contains a whole range of products which investors see as differentiated by risk and return. The market, in other words, is weakly segmented. The premiums paid on loans of different types reflect agents’ willingness to hold assets or incur liabilities with different characteristics.

## 10.2 The effect of term

As we can see from Equation 10.1, we expect both term and risk to be associated with positive premiums. Indeed, we can turn the equation into a diagram, Figure 10.1.

In this diagram, we can see any nominal rate of interest as being made up of ‘layers’ corresponding to each of four components.  $r$  is the real, short-term, risk-free rate.  $i$  is the nominal rate, incorporating only an inflation premium.  $i'$  is the nominal rate on a risky loan with  $n$  years to maturity. Notice that we have drawn the figure with term to maturity on the horizontal axis and that the liquidity premium is shown to increase with the term. The same positive relationship would very likely appear between the risk premium and the degree of risk if we put risk on the horizontal axis.

Figure 10.1 suggests that for a given short-term rate of interest, long-term loans will cost more than short-term loans. The idea that a liquidity premium *positively* related to the term of a loan is ‘normal’ has a long pedigree and it can be explained in two ways.

The first, and simplest, explanation is the one we touched upon in Section 1.1. There we suggested that lenders generally prefer to lend for the shortest period while borrowers prefer to borrow for the longest possible period. We say ‘generally’ since preferences will vary between individual investors. Pension funds, for

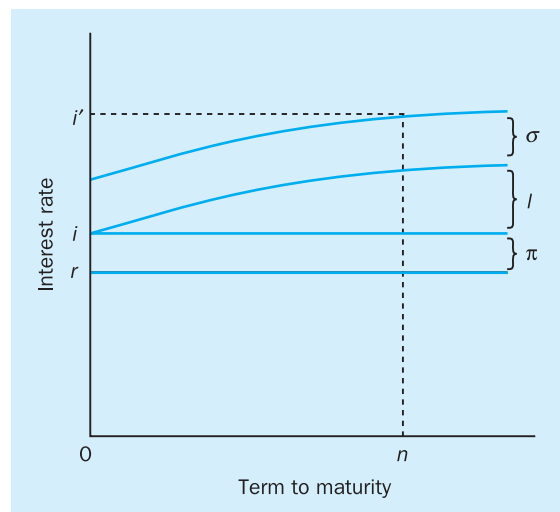


Figure 10.1 The composition of nominal interest rates

example, are more inclined to hold long-term assets because of their need to earn a guaranteed long-term income. However, if we assume, as seems reasonable, that *on balance* lenders prefer to lend short-term, then borrowers will have to pay lenders a premium for the use of longer-term funds in order to induce them away from their preferred position.

Lenders' preference for short-term loans, in this argument, arises out of uncertainty. Although lenders may *plan* to have funds available for lending for a long period, there is always the danger that they may need to have use of the funds earlier than they planned. Having funds tied up for a long period in those circumstances would then be costly, in either preventing the lender from carrying out urgent spending, or forcing him or her to borrow and pay interest, or leaving him or her unable to pay bills, which might in turn spell bankruptcy or at least major embarrassment. Short-term lending thus has a flexibility – the choice to use the funds once again for spending at short notice or to re-lend if convenient.

Borrowers' preference for long-term loans arises precisely because they wish to avoid the costs associated with having to renegotiate or replace loans when they mature. It helps if we bear in mind that in any economy there are agents who are debtors on a more or less permanent basis (firms, for example). They are not, as individuals might be, borrowing to cover a temporary shortage of funds. They know that when a loan falls due for repayment they will have to replace it and the uncertainty they face is that the conditions (the rate of interest, for example) on which the loan can be replaced are worse than they were when the original first loan was taken out at the start of the investment project. Borrowers are therefore said to be prepared to pay more for long-term loans in order to avoid this **reinvestment or rollover risk**.

The **liquidity premium** is thus a premium required to tempt lenders from their short-term preference and it is a cost that borrowers are willing to pay in order to have guaranteed long-term use of funds. Notice that in Figure 10.1 the liquidity premium is shown increasing with the term of the loan *but at a diminishing rate*. Clearly, this suggests that lenders are prepared to discriminate sharply between lending for, say, one year and five years but are much less concerned about the difference between, say, a 20-year and a 25-year loan. One might rationalize this in a rather casual way by saying that the difference in length between a four- and five-year loan is 25 per cent while an additional

25 per cent on the term of a 20-year loan is an additional five years. More strictly, the reason for the diminishing rate of increase in the premium lies in the practice of discounting. The present value of any future income flow depends upon the rate at which we discount it and upon the length of time we have to wait for it. If  $i$  is an appropriate rate of discount then the discount term (by which we divide the income) is  $(1+i)^t$ , where  $t$  is the number of periods for which we have to wait. The effect of raising this denominator to the power  $t$  is to reduce the present value of future income payments quite quickly. Payments in 20 years' time are therefore very heavily discounted and lenders will thus be comparatively indifferent between lending for 20 or for 25 years.

It is not difficult to understand that lenders and borrowers may have different preferences regarding the length of loans and that this might explain the existence of positive liquidity premiums. However, the idea that interest rates (and yields and rates of return when we come to them) vary positively with the term to maturity is much more general than its application to loans would suggest. For this we need a second, probably more general, explanation for such premiums. Implicit in our discussion so far is the idea that once a loan is made for  $x$  years, it cannot be liquidated until  $x$  years have passed (except perhaps at some considerable penalty). This is of course generally true for what we might call **non-marketable loans**, loans of the kind typically made by banks or building societies or even by individuals between themselves. As we said in the introduction to this chapter, the fact that some loans are made for short periods and some for long makes them very highly differentiated products. However, much lending, particularly where large amounts are concerned, is not of this kind. It involves the borrower issuing some form of instrument which is bought by lenders in a primary market. Such instruments, once issued, are tradable in a secondary market. Company shares, corporate and government bonds and bills are obvious examples. In such cases, it makes little sense to say that buyers of newly issued 20-year corporate bonds require a liquidity premium to induce them to lend for 20 years, since they could sell the bonds at any time in a highly efficient market in order to retrieve the funds which they had initially lent. Buying a long-dated bond does not therefore mean that one is making a longer-term loan than if one had bought a short-dated bond and yet it is widely accepted in bond markets that, *other things*

being equal,<sup>1</sup> longer-dated bonds will often carry a higher yield than shorter-dated ones.

The explanation lies in the behaviour of asset prices when market interest rates change. A firm (or government) which issues 20-year bonds in order to fund a deficit must obviously do so at a *price* and this must be acceptable to the market. Furthermore, the bonds must yield to their buyers a known series of payments which are desirable, at the price which has to be paid. These payments are often indicated by the ‘coupon rate’ which appears in the title of the bond. (A ‘10% Exchequer’ bond, for example, carries a fixed payment of £10 to its holder every year.) If market interest rates change, the only way in which this fixed series of income payments to bondholders can adjust with them is if the market price of the bonds changes (falling when interest rates rise, for example). In Chapter 16, we shall give a formal proof that the sensitivity of asset prices to changes in interest rates is directly related to a concept known as ‘duration’, which itself depends upon the remaining life of the asset. Unfortunately, the mathematics are rather intimidating and, again, it is helpful to know more about the characteristics of bonds before attempting the proof. But we can *illustrate* the effect of term fairly easily. Imagine that we are dealing with a range of fixed-interest bonds which mature at a fixed point in the future. Then the formula for their value is:

$$P = \sum_{t=1}^n \frac{C_t}{(1+i)^t} + \frac{M}{(1+i)^{n_m}} \quad (10.2)$$

This expression tells us that the bond’s value consists of two elements. These are the sum of the coupon payments ( $\Sigma C_t$ ) and the final payment of the maturity value ( $M$ ). Notice that each element of cashflow has to be discounted.  $t$  is an index standing for the year (counting from now) in which the payment is made;  $n_m$  is the number of years to maturity. In every case we discount by  $(1+i)$  where  $i$  is the current market rate of interest for bonds of this duration and risk.

Imagine now that we are looking at two bonds which differ only in their term to maturity – one matures in two years; the other in five. This means that their redemption values,  $M$ , are equal and that their coupon payments  $C_t$  are also identical. Suppose

that  $M$  is £100 and that we are dealing with 10 per cent bonds, so that  $C_t$  in each case is £10. The coupon payments are annual. Finally, let us assume that relevant market interest rates are 12 per cent.

The value of the two-year bond consists of the present value of two payments of £10, where the first is received in one year’s time and the second in two years’ time, plus the value of £100, also receivable in two years’ time. From Equation 10.2 we know that each of these payments has to be discounted by the current rate of interest, that is by the term  $(1+0.12)$ . Using discount tables, we can see that the present value of £10 received in one year’s time is £8.93. We can also see that £10 two years hence is worth £7.97 now, and that the present value of £100 in two years is £79.72. The total value of these payments, and the present value of this bond, is thus £8.93 + £7.97 + £79.72, or £96.62.

For the five-year bond we have a series of five payments, the first payable in one year and the last in five years. The value of this income stream, again discounted by the factor 1.12, is:

$$£8.93 + £7.97 + £7.12 + £6.36 + £5.67 = £36.05$$

The present value of £100 received in five years is £56.74, making the present value of the bond £92.79.

Now suppose that interest rates fall to 8 per cent. We should by now be familiar with the *direction* of the effect, which will be to increase the value of both bonds, but the question is by exactly how much in each case? The answer can be found by working through Exercise 10.1. This should be done before reading on.

When interest rates are 8 per cent, the present value of a 10 per cent bond maturing in two years is £103.56 (£9.26 + £8.57 + £85.73). The value of a five-year bond of identical characteristics in the same circumstances is £107.98 (£9.26 + £8.57 + £7.94 + £7.35 + £6.80 + £68.06). We can now compare the prices for these two bonds at the two different rates of interest. Table 10.1 summarizes the results.

For a four-point change in interest rates, we can see that the price of a two-year bond changes by £6.94 (£103.56 2 – £96.62), equivalent to 7.2 per cent, while the price of a five-year bond changes by £15.19 (£107.98 2 – £92.79), equivalent to 16.4 per cent.

<sup>1</sup> The ‘other things’ which are crucial are (a) expectations that future interest rates remain as they are now and (b) bonds are homogeneous with respect to default risk.

**Exercise 10.1 The effect of term on bond values**

- Following the example in the text, find the present value of a 10 per cent bond, maturing for £100 in two years' time when the rate of interest is 8 per cent.
- Find the value of a five-year bond, with the same characteristics, when the rate of interest is 8 per cent.
- Compare their present values at this rate of interest.
- Now compare the present values calculated with interest rates at 8 per cent with the values calculated (in the text) when interest rates were 12 per cent. Which bond shows the largest price rise when interest rates fall?

**Table 10.1** Term and value

Interest rate ( $i$ )	Term ( $n$ )	
	$n = 2$	$n = 5$
$i = 0.12$	96.62	92.79
$i = 0.08$	103.56	107.98

Thus, the fact that assets can be sold in secondary markets means that lenders can retrieve their funds (a long-term loan is not illiquid provided it is marketable) but what we have just demonstrated suggests that the risk that prices might be above or below what sellers require is greater for long-dated than short-dated loans. Hence, given certain other assumptions, we might expect a term-related premium to be paid, even on loans which are marketable, if they are loans made at a fixed rate of interest. The relationship between the yield on assets and their term to maturity, a subject known as the **term structure of interest rates**, is a major issue in financial economics, with a number of important applications. To discuss it in depth, we need to know more about the characteristics of assets, particularly bonds, and asset markets, so we defer further discussion until Chapter 16. We accept, for now, that *positive* term premiums are likely because of the preferences of lenders (for lending short in the case of non-marketable loans and for minimizing capital risk

with marketable ones) and the preferences of borrowers (for borrowing long).

**10.3 The effect of risk**

We said in Section 9.2 that interest rates influence behaviour which involves commitments over a period of time. Loans are made for a period (even if they can be sold on in a secondary market, the original *intention* was a commitment for a period). Debts are entered into for a period of time. It will often be more difficult for a borrower than for a lender to get out of a loan contract since the funds may well have been invested in a long-term project with a long payback period. All of this means that lenders and borrowers are entering into contracts which involve some degree of *risk*.

As we already know from Section 8.2, 'risk' in financial terms refers to the possibility that outcomes may differ from what was expected and it is usually assumed that the degree of risk can be measured and expressed as a probability statement, calculated on the basis of past outcomes. The risk thought to attach to an individual loan or asset is thus obviously one element in the size of the risk premium. Remember (from Section 8.4) though that there is a second element. This is the 'price of risk'. By this we mean the price of 'average' or 'standard' risk and in Section 8.4 we saw that this is often taken to be represented by the difference in the rate of return on a portfolio of assets representative of the whole population of risky assets and the return on risk-free assets. We called this the 'market price of risk' and we noted that it would rise or fall with changes in the community's degree of risk aversion. The **risk premium**,  $\sigma$ , paid on a particular loan or asset will depend therefore upon the riskiness or the perceived riskiness of the loan itself relative to the representative portfolio multiplied by the market price of average or standard risk. A change in the risk premium, therefore, can be the result of changes in the characteristic of the asset (a change in its own riskiness) or the result of changes in the level of risk aversion in the community at large.

Risk can take many forms. For example, one can distinguish **default risk** (the borrower cannot repay the principal) from **capital risk** (the loan has a lower nominal value when it terminates – a possibility if one has to sell bonds in the open market rather than wait to maturity, for example) and from **income risk** (the

possibility that the flow of interest, dividends or other payments are less than were expected).<sup>2</sup>

These forms of risk can have various sources. For example, it is common in the finance literature to distinguish between *business risk*, which means the risk which arises from the nature of the activity to which the borrower intends to apply the borrowed funds, and *financial risk*, the additional risk which arises from the overall pattern of financing that the borrower chooses.

We know also (from Section 8.4) that some risk attaching to individual assets (specific risk) can be diversified away by combining assets in a portfolio. When all the gains from diversification have been exploited, however, the fact remains that some loans will be riskier than others (by virtue of their differing exposure to market risk). It seems reasonable to suppose that savers willing to lend, let us say, £1 million at 10 per cent to a risk-free borrower would require a larger reward if they were to lend the same amount for a risky purpose. Thus lenders require a 'risk premium', a payment over and above the risk-free rate to induce them to lend a given amount. In a diagram, the supply curve of risky funds lies above the risk-free supply curve by the amount of this premium. The pre-

mium itself, of course, varies with the degree of risk and the market's attitude to risk.

Thus large corporations may be able to borrow by issuing corporate bonds which offer a rate which is only slightly greater than the rate paid by government on its bonds. On the other hand, we should expect that ordinary company shares will generally pay a better return (dividend payments plus capital growth) than corporate or government bonds. This is because dividends are variable and because the claims of ordinary shareholders, both to profits and to residual assets in the event of bankruptcy, rank well behind the claims of other creditors and of subscribers of fixed-interest capital.

#### 10.4 Expectations and government borrowing

So far, we have said that different types of asset/liability will carry different rates of interest because they are essentially different products. They are differentiated by term and by risk. In this section, however, we shall see that even if we take a subset of instruments which look homogeneous, we may still see a range of interest rates payable on them. Our subset could be government bonds, or treasury bills, or, possibly, interbank deposits. In each of these categories, within any national market, the default risk is uniform (and very close to zero in most countries). European governments are not generally expected to default on their bond or bill obligations and, even if they were, there is no basis to suppose that default is more likely on long- rather than short-dated bonds or vice versa. Similarly, the market for interbank deposits is dominated by a few major banks of equal creditworthiness. Furthermore, within each category the instruments are homogeneous in the sense that they can be instantly traded, regardless of maturity. A three-month treasury bill does not require a longer commitment of funds than a one-month treasury bill. And yet it is usually the case that if we plot the interest rate (usually called the 'yield' in this context) against the term to maturity, we observe a pattern to which a smooth curve can

#### Exercise 10.2 Interest rates – term and risk

- 1 Check the financial press to find the current yield on government bonds. Sketch roughly in a graph any relationship that you can see between the return and the term to maturity. (Hint: use *redemption yield*.)
- 2 Check the financial press for the return on corporate bonds. How does the return on corporate bonds compare with the return on government bonds? What explanation can you offer for any differential?
- 3 Let us suppose that we observe a premium in the rate of return on corporate bonds over the rate on government bonds and that over a period of time we see this premium increasing. What conclusions might we be tempted to draw?

<sup>2</sup> Notice that lenders making fixed interest but marketable loans (for example, bonds) are in effect avoiding income risk but only at the expense of accepting capital risk (the risk that they may have to sell before maturity at a price which is different from that which would be expected at maturity). This is the case that we discussed in the last section and one might say, therefore, that what we there called a 'term' premium could be seen as a 'risk' premium to compensate for the interest-sensitivity of bond prices.

usually be fairly closely fitted. This plot is known as a **time–yield curve**.<sup>3</sup>

The most commonly advanced explanation for a systematic relationship between yields and term, among assets which are homogeneous except with respect to term to maturity, is *expectations of future interest rates*. The argument is that if people expect short-term interest rates to be higher (lower) than they are now, *current* long-term rates will be above (below) current short rates; that is, expectations about *future* changes affect the *current* structure. Why the present should be influenced by events which have not yet occurred seems rather mysterious. But a moment's thought makes it at least intuitively obvious. Lenders willing to lend for a period longer than the minimum available clearly have a choice. They can either lend for the shortest possible period and then re-lend at the end of that period and re-lend again and so on, or they can agree to lend now for just one period corresponding to their investment horizon. Assume that the yield curve is stable. This must mean that lenders and borrowers are broadly happy with the current pattern of interest rates and therefore we have an equilibrium position. (If they were not, then there would be a general shift towards lending long, or vice versa, and the yield curve would be changing its shape.) If we have equilibrium, then it follows that lenders are currently indifferent about whether they lend for a series of short periods or one longer period. If we ask ourselves, 'in what circumstances would investors be indifferent between a series of short loans and one long loan?', the answer ought to strike us quickly that they will be indifferent when the returns they expect from both strategies are equal. In other words, the reward for the long strategy must be equal to what lenders think they will get from a series of short loans. The reward for the long strategy must equal the average of the series of short loans. This is where expected future rates enter the picture. Since we can only know the *current* short loan rate, we have to make an educated guess at likely *future* short rates. What we guess must be responsible for any observed difference between current short and long rates. That is, expected future short rates are implicit in any difference between current long and short rates.

Suppose for simplicity that a short loan is for one year and a long loan is for two years. Suppose, furthermore, that the current short rate ( $i_s$ ) is 6 per cent while the current long rate ( $i_L$ ) is 8 per cent. If this differential is stable then lenders are happy with the prospect of what they will earn by lending for one year and then renewing at the expected one-year rate compared with what they would get by lending now for two years. Formally, it must be the case that they expect:

$$(1 + i_s)(1 + \hat{i}_s) = (1 + i_L)^2$$

where  $\hat{i}_s$  is the expected *future* short-term (one-year) rate.

Rearranging gives us:

$$(1 + \hat{i}_s) = (1 + i_L)^2 / (1 + i_s)$$

Substituting actual values gives:

$$\begin{aligned} (1 + \hat{i}_s) &= (1.08)^2 / (1.06) \\ &= 1.1664 / 1.06 \approx 1.10 \end{aligned}$$

If  $(1 + \hat{i}_s) = 1.10$ , then  $\hat{i}_s = 1.10 - 1 = 0.10$  or 10%

In this example, therefore, we can see that if current short rates are 6 per cent and long rates are 8 per cent then this suggests that people expect short rates to rise to 10 per cent before the second period begins.

In this example, therefore, the yield curve slopes upward and long-dated bonds have a higher yield not because they involve a greater sacrifice of liquidity than short-dated bonds but because their current yield persuades those willing to lend for a longer period that they will do just as well from long-dated bonds as they will from holding a succession of short-dated ones, bearing in mind what is expected to happen to interest rates on short-dated bonds in future. Conversely, if the market expected short rates to fall in future, the yield curve would be downward-sloping. The argument then would be that investors would still be willing to hold (lower yielding) long-dated bonds because this would give them the same return as a succession of short-dated bonds, bearing in mind that short rates in future would be lower than they are now, and indeed lower than current long rates.

The relationship between yields on assets differentiated only by their term to maturity is known as the

<sup>3</sup> We shall look at time–yield curves, their construction and interpretation, in more detail in Chapter 16. We shall see, for example, that 'yield' (for bonds in particular) can be measured in a number of different ways. For the moment, readers who wish to scan the bond yield columns of a financial newspaper to form a mental picture or to do a freehand drawing of a current time–yield curve, should use the figures in the column showing 'redemption yield', or its equivalent.



*term structure of interest rates* and we shall return to it in Chapter 16 when we study government bonds in more detail. The term structure (the shape of the yield curve) is an issue of great interest to economists precisely because it may be dominated by markets' perceptions of future interest rates. For example, if it does, and if those perceptions were generally correct, then we could use the yield curve and our calculations above to derive **future implied** short-term rates, that is, to calculate what future short-term rates were expected to be. The yield curve would be a useful forecasting tool. Furthermore, if we were to combine the yield curve with the Fisher hypothesis (see Section 9.3.1) then we could derive future implied interest rates and implied *inflation* rates.

To say that expectations of *future* short-term rates determine the relationship between *current* long and short rates is one thing, however; knowing what affects expectations is something else. And yet profitable investment in financial markets would be much easier if we did know how expectations were going to change. For example, we saw in Section 10.2 that bond prices would change inversely with changes in interest rates (and that long-dated bond prices would change by more than short-dated ones). Obviously, therefore, investors will wish to sell bonds if they expect interest rates to rise and to buy them if they expect a fall. Notice then that the expectation itself is sufficient to cause the changes in prices and yields that were expected! For an individual investor,

### Box 10.1 Guessing the next step



#### MARKET INSIGHT

## Fed's weapon of words pops balloon of high expectations

By Deborah Hargreaves and Jennifer Hughes

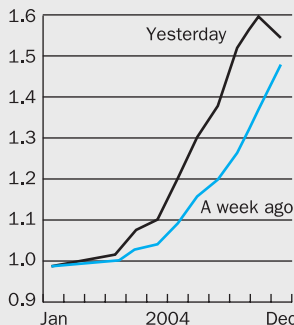
Financial markets have become accustomed to the US Federal Reserve Saying it will keep monetary policy accommodative for a "considerable period". Although the US central bank on Wednesday kept interest rates unchanged, it altered its phrasing about the outlook and the after-shock rippled rapidly through asset prices.

"There is now a little more certainty that the Fed might do something this year and that went like an electric shock through the market," said Andrew Milligan at Standard Life.

Wall Street saw a sharp sell-off after the Fed's statement, two-year Treasury yields rose sharply and the dollar gained about two cents against the euro in the immediate aftermath.

Many strategists believe financial markets initially overreacted to the

Derived from Fed Fund futures contracts (%)



US interest rate expectations

Source: Thomson Datastream

Fed's shift in phrasing as it caught investors by surprise.

Market participants had widely expected the Fed to keep the phrase "considerable period" and had positioned for some dollar weakness. The dollar's rapid rise

sparked a wave of covering of these short-dollar positions.

After further reflection yesterday, many believe the central bank is creating more room to manoeuvre but not necessarily signalling an imminent change of stance.

Deutsche Bank said the Fed's use of the phrase "considerable period" was contributing to a market perception that it would do nothing this year. Peter Hooper, chief US economist, said the Fed's open market committee may have felt that was too constraining.

The Fed's new statement says: "The committee believes that it can be patient in removing its policy accommodation".

Divyang Shah at IDEAGlobal said this was the key to the Fed's stance. It replaced the phrase: "Policy accommodation can be maintained for a considerable period."

Source: *Financial Times*, 30 January 2004.

the trick is to be first to anticipate any change in expectation.

One obvious source of influence on expectations will be all those events that markets think may herald a change in inflation. Faster credit growth, rapid falls in unemployment, a rise in imports relative to exports may all suggest that prices will rise more rapidly in future. If one assumes that higher inflation means higher interest rates, without necessarily believing in the full rigours of the Fisher hypothesis, then all these events suggest higher (rather than lower) future interest rates, and the yield curve will steepen.

Frequently anticipating changes in future rates of interest (and anticipating changes in expectations of changes) involves an appraisal of the authorities' monetary policy objectives and thus how policy instruments may be changed in response to events. This is easily understood in the light of our discussion about central banks' influence on short-term interest rates in Section 9.4. If the government is known to desire low inflation above all else, then all of the events that we mentioned in the last paragraph become connected with higher interest rates through a second channel: the authorities' response. For a real example, we may recall that in the early 1980s many governments pursued explicit money supply growth targets. Thus an overshoot, for example, in the figures immediately led to expectations that the authorities would raise short-term rates in order to reduce monetary growth in future. The consequence would be that the yield curve would steepen, showing an expectation of a regime of higher short-term rates in future. A rise in long-term rates means, of course, a fall in the price of longer-dated bonds and one can trace the markets' changing perceptions of what really mattered to the authorities by tracing the changes in events to which bond prices are sensitive. In the early 1980s, as we just observed, the bond market was very sensitive to money growth figures. In the UK, this became less important in the mid-1980s, when money growth targets fell out of fashion and the market (and the yield curve) became very sensitive instead to quite small movements in the exchange rate, as the authorities were believed to have a policy of shadowing the Deutschmark.

Box 10.1 provides an amusing example of the markets' attempts to anticipate the US Federal Reserve's next step on interest rates. In the end, they seem to have come to the conclusion that a minute change of wording in a public statement by the Fed increased the likelihood of a future rise in interest rates. The chart shows the yield curve steepening as we would expect.

The discussion also suggests that a degree in linguistics might be a useful qualification for money market participants.

One issue which has always had a significant effect upon the shape of the yield curve is the level of government borrowing. Financial markets in all countries pay close attention to the monthly government borrowing figures in relation to the anticipated outturn. As we have seen above, this may be for two seemingly conflicting reasons.

Firstly, higher than expected public sector borrowing may cause fears of a willingness on the part of the authorities to tolerate higher inflation than the market would like. In such cases, the markets are assuming that the increase in debt is likely to be financed by borrowing from the banking sector with a consequent increase in bank deposits and the money supply. Although the form of the link between the rate of growth of the money supply and the rate of inflation remains controversial both theoretically and empirically, there can be no doubt that there is a strong acceptance within financial markets of the proposition that money-financed government debt will cause inflation. As long as that remained true, an increase in government debt would generate inflationary expectations and creditors would demand higher interest rates in future to preserve the real rate of return on their funds. Given the time lags involved in monetary policy, however, we would not be talking here about an immediate increase in the inflation rate, but an increase more than a year hence. The yield curve would steepen from that point on.

On the other hand, if the authorities in question have a reputation established over a number of years of being tough on inflation, the markets may react to higher than expected public sector borrowing in a quite different way – assuming that the government would finance this increase in debt by borrowing from the non-bank public with the possibility that interest rates would need to rise immediately to bring this about. Even if it were possible for the government to borrow more from the non-bank public without interest rates having to rise, inflation-conscious authorities would very likely act to cause interest rates at the short end of the market to rise, precisely because it would be aware of the market fears of inflation mentioned in the previous paragraph. In such a case, an announcement of higher than expected borrowing would produce an expectation of an increase in short interest rates not accompanied by fears of longer-term inflation. The shape of the yield curve would clearly

be different in this case from the previous one even though the markets would in both cases expect interest rates to rise at some point.

We have suggested that the assessment by the markets of the likely response of the authorities to higher government borrowing depends on the authorities' past anti-inflationary reputation. Much also depends on institutional arrangements. A strong belief has developed in recent years that central banks which are constitutionally independent of government are likely to operate tougher monetary policies than those which are, in varying degrees, dominated by government. In the former regimes, higher than expected government borrowing would very likely produce an expectation of an immediate increase in short-term interest rates. In contrast, in regimes where the government could put pressure on the central bank such an announcement might produce fears of future inflation. These fears would be all the greater if there were an election in prospect because the markets would assume that the government would be unwilling to raise either taxes or interest rates for fear of losing votes.

In 1997 there was an interesting development in the German yield curve which could be traced to these market attitudes. It was generally expected that, despite strong statements to the contrary, the European Central Bank, which would operate monetary policy after establishment of European Monetary Union, would be less able to adopt a tough anti-inflationary stance than the *Bundesbank* had previously done. For this reason, the markets expected an increase in German inflation after 1999 and German interest rates have increased sharply on financial instruments maturing after that date. This emphasizes the point that it is what is believed in financial markets which is crucial here. Whether any economic analysis underlying these beliefs is sound is of little relevance.

## 10.5 Summary

Any developed economy offers a wide range of financial instruments to lenders and borrowers. These offer a correspondingly wide range of rates of interest or other forms of return. The minimum return that will be available will be the risk-free, short-term nominal rate of interest. This will be available, obviously, on very short-term loans of zero risk. In practice, the rate on one-month treasury bills might be representative. Everything else will offer a rate of return in excess of this. On top of the short-term, risk-free rate there sits a structure of interest rates. This structure is determined by the willingness of lenders to hold assets which are not risk-free and short-term, relative to their supply. We generalize that two characteristics in particular affect demand. These are 'term' and 'risk' and they affect demand negatively. That is to say that as term and risk increase, lenders, on balance, become less willing to hold such assets and require 'premiums' to induce them to do so. As we have said many times, lenders are assumed to be risk averse and to be attracted by liquidity.

But there many other influences on supply and demand for funds and if these operate in respect of particular classes of funds then they will contribute to the structure of interest differentials. One set of influences is the expectation that people hold about future movements in interest rates. Their investment decisions now will try to take account of future possible returns and those decisions will affect the current structure. Another influence, which has been topical in recent years, has been the public sector's demand for funds. If this demand were uniform across funds of all types, of course it would be irrelevant to the *structure* of rates. But, as we have seen, governments tend to borrow funds at longer maturities and this can, certainly in principle, affect relative returns.

### Key concepts in this chapter

Term premium	Interest elasticity	Default risk
Liquidity premium	Interest spreads	Capital risk
Risk premium	Implied future rates	Income risk
Term structure	Reinvestment risk	
Time–yield curve	Non-marketable loans	

### Questions and problems

- 1 Why might lenders demand a premium for lending long term?
- 2 Does your answer to (1) explain why long-dated bonds often have higher yields than short-dated ones? If not, what alternative explanation can you offer?
- 3 Look at the financial press and find the current interest spread between 5-year and 10-year government bonds. Is there a positive term premium?
- 4 What conclusion might you draw about possible future interest rates if a positive term premium were to increase?
- 5 What name do we give to the pattern of yields available on bonds of different maturities?
- 6 Using the financial press, compare the redemption yield on one or more *corporate* bonds with that on *government* bonds with a similar term to maturity. How would you explain any differential?
- 7 What conclusions might you draw about future developments in the economy if corporate yields were to rise relative to yields on government bonds?

### Further reading

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## Chapter 11

# The valuation of assets

### *What you will learn in this chapter:*

- How the risk-free rate of interest combines with a risk premium to determine the required rate of return on an asset
- Why it is that, in equilibrium, a tradable asset will be priced so as to yield the required rate of return
- How to use the required rate of return to analyse asset price movements within a supply and demand framework
- The connection between the required rate of return and the 'fundamentals' of an asset's value
- Some of the implications of a market's failure to price assets according to their required rate of return

**11.1 Introduction**

In this chapter we want to bring together what we have learned so far from Chapters 8, 9 and 10. In Chapter 1 (Sections 1.4 and 1.5.3) we explained that other things being equal the price of assets moves inversely with their rate of return. Thus it follows that if we know the required rate of return, then (again all else being given) we know the price at which assets will be willingly held. In Chapter 8, therefore, we concentrated on the determination of the required rate of return. This, we said, would be equal to the risk-free rate of return and a risk premium calculated from the price of ‘average’ or whole market risk and the asset’s individual risk characteristics relative to those of the market as a whole. An asset that is ‘fairly priced’ will yield a return which places it on the security market line. The equation for asset *A* is:

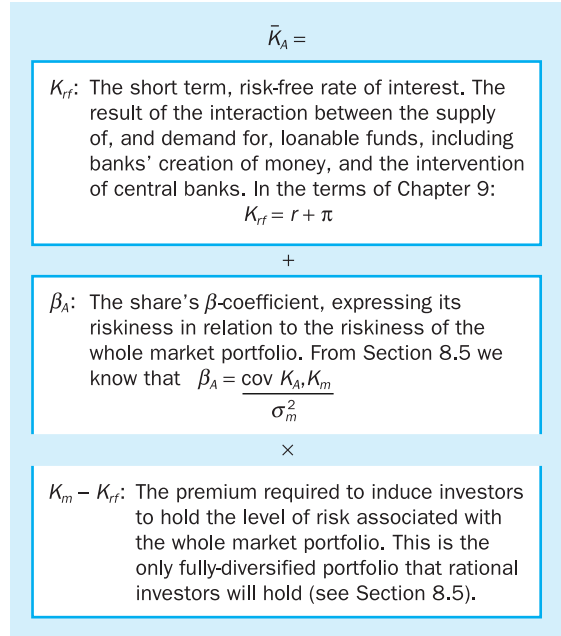
$$\bar{K}_A = K_{rf} + \beta_A(K_m - K_{rf}) \tag{11.1}$$

and we can interpret Equation 11.1, less formally, as saying that:

$$\begin{matrix} \text{the required} \\ \text{rate of} \\ \text{return} \end{matrix} = \begin{matrix} \text{the risk-} \\ \text{free rate} \end{matrix} + \left( \begin{matrix} \text{the quantity} \\ \text{of risk} \end{matrix} \times \begin{matrix} \text{the price} \\ \text{of risk} \end{matrix} \right)$$

In Chapter 9 we went on to explore the determination of the risk-free, short-term rate of interest. We said that this is the outcome of market forces, represented by the demand for and supply of loanable funds (where this included the money-creating activities of banks) modified, in some situations by the administrative decisions of central banks. In symbols,  $K_{rf} = i = r + \pi$ .

The ‘fair’ price of an asset will be as illustrated in Figure 11.1. We want now to see formally how it is that the required rate of return determines asset prices and how changes in the required rate cause asset prices to change. We can analyse the behaviour of asset prices using the conventional supply and demand apparatus. The theme of the rest of this chapter, therefore, is how we can incorporate changes in the required rate of return into a supply and demand framework. After some preliminary clarification (in Section 11.2) we shall do this (in Section 11.3) by looking at the markets for two ‘stylized’ assets, company shares and fixed-interest bonds. We say ‘stylized’ because we shall only describe these assets and their markets in the barest essentials – only as much as we



**Figure 11.1** The origin of the required rate of return

need to understand the theory. The detail of these markets, and others, is discussed in Part 5 of this book.

Throughout Part 3 of this book we have been trying to provide an intelligible account of the orthodox theory of portfolio choice and asset valuation. In Section 11.4, therefore, we take a little space to raise some critical questions about the orthodox theory and to suggest that there are other, more controversial, ways of interpreting the processes that we have described so far.

Before we begin, though, we need to be absolutely clear what it is that we are trying to explain. Some preliminary clarification is therefore provided in the next section.

**11.2 Supply and demand in asset markets**

When we apply a supply and demand framework to the valuation of assets, there are two pairs of distinctions that it is useful to make. The first is the distinction between assets that are tradable between third parties and those which can only be ‘bought’ and ‘sold’ between the original supplier and the original buyer. The second

distinction is between stocks of assets and flows. We have met both of them before, in Sections 1.4.1 and 1.2.4 respectively. Most of us are likely to be more familiar with supply and demand as applied to flows – of newly created goods and services per period of time, for example. But we shall see that stock demand is at least as important in financial markets.

### Tradable assets

Let us assume to begin with that we are dealing with **tradable assets**. These are securities like bonds, bills or company shares which, after issue, can be bought and resold many times. At any particular time, there exists a very large number of these assets. This is a *stock*. There may also be new issues taking place, in which case there is also a *flow* causing the stock to expand. In practice, the stock is likely to be very large relative to the flow and, frequently indeed, the flow will be zero. In equilibrium, this stock must be willingly held. This does not mean that there will be no trading. It simply means that another set of *flows*, the flows of orders to sell, match the flows of orders to buy at the prevailing market price. Clearly, in equilibrium, the price at which the stock is willingly held must be the same as the price at which trading is taking place. A fall (for example) in the price at which trades are taking place can only occur if the numbers wishing to sell at the earlier price increase relative to buyers and this means that more holders of the stock think it currently overvalued than think it currently undervalued. In trading, the price falls to a new equilibrium (sell orders match buy orders) only when once again the balance of those thinking it overvalued is matched by those who think it undervalued. Explaining the price of financial assets, therefore, amounts to explaining what it is that makes holders of the stock of assets willing to hold the stock at a given price. Furthermore, since changes in the stock (as a result of new issues, or cancellations for that matter) are small relative to the size of the stock and discontinuous, discussions of changes in price come down in practice to discussing changes in *demand* for the stock. The question becomes one of ‘what makes investors change their view of the value of these assets?’ The appropriate diagrams are stock diagrams. The supply curve is vertical (and subject to small rightward movements as new issues take place). The demand curve is downward-sloping and it is shifts in the demand curve that occupy most of our attention when we discuss asset price changes.

This does not make flows irrelevant. Firstly, as we just said, flows of new issues cause the stock to expand. Continuous government borrowing on a sufficiently large scale could cause the stock of bonds to expand so rapidly that the price might fall, for example. Furthermore, we are sometimes interested in the details of the trading process itself. This happens when we come to discuss the role of ‘market-makers’ in different trading systems. As we noted above, market-makers are dealing in flows of orders to buy and sell and in making a margin or profit out of those orders. When we look specifically at the role of market-makers we shall encounter more familiar supply and demand diagrams with flows on the horizontal axis and upward-sloping supply curves. Trading systems are among the institutional details which we postpone until Part 5 of this book.

### Non-tradable assets

Although, of course, we can still bring our conventional supply and demand apparatus to the analysis of markets for **non-tradable assets**, the situation is rather different from the one we have just described. With tradable assets, there is a stock to be traded which exists even if the issuer of the assets decided to issue no more. With banks, savings institutions, insurance companies, pension funds and so on assets can be disposed of only by returning them to the originator and, in complete contrast with securities markets, the originator of the asset cannot stand aside from the demand. If there is an increase in the demand for IBM shares, for example (because people think they are undervalued), this requires no immediate response from IBM. If there is an increase in the demand for insurance contracts from Allianz, by contrast, the firm can supply more. If demand continues at a high level, Allianz may revise the terms on which it issues the contracts, making them less favourable to investors but more profitable to itself, but it cannot stand aloof in the way that a company can from the market for its shares. This gives us a number of problems about the way in which we use our supply and demand apparatus.

Firstly, in most of these cases of non-tradable assets there is no explicit price. There is an explicit yield, or rate of return, which *implies* a price but we normally draw supply and demand diagrams with respect to price. If we draw them with respect to yield, then the slopes must be reversed. As the yield on an asset rises, more investors will be willing to buy it, *ceteris paribus*. By contrast, the higher the yield demanded

by investors, the less willing issuers will be to issue contracts. Secondly, there is the question of whether we are dealing with a stock or a flow. The correct answer to this is that we should deal with whichever seems to provide the most useful insights in a given situation. The apparatus is only a means to an end. In practice, the answer probably depends upon the time period in which we conduct the analysis. Of course institutions are opening new deposit accounts, new insurance, new pensions contracts and so on all the time. But accounts and contracts are being closed on a continuous basis too. The net flows may be very small or even zero in the short run. In this case we are dealing with a stock. The supply curve is vertical (and the demand curve slopes upward with yield on the vertical axis, remember). On the other hand, if the focus of attention is a longer period, we may prefer to discuss supply as a flow (with the supply curve sloping downward).

### 11.3 Asset valuation

Real assets are goods that provide a flow of output or services over a period of time. The output or service has a monetary value and so we can talk about assets as goods which yield a future stream of income. *Financial* assets are claims upon the real assets and upon their future income stream. The basic principle in the orthodox valuation of assets is that:

the (present) value of an asset is equal to the sum of its future income stream (net of running costs), suitably discounted.

Notice that this gives rise, in theory, to an identity between the value of the underlying *real* assets (the sum of their discounted future income stream) and the value of the financial assets whose own income stream is simply the income generated by the real assets passed on to the current owners of those real assets. (We shall see in Chapter 17 that this identity may need to be modified in practice to take account of taxation.) Thus the value of a firm, for example, is equal to the future discounted income stream from the assets which make up the firm and this *should* (assuming no tax) be equal to the market value of the shares in issue.

The practical difficulties of asset valuation revolve around estimating the future income stream (which is at best uncertain), estimating the running costs, and choosing an appropriate rate of discount. These are

very real difficulties. In practice, they are to some extent side-stepped by concentrating upon *relative* valuation. That means that most of the time practitioners in financial markets are looking to see whether an individual asset is over- or undervalued when compared with other assets for which it is a very close substitute. In these circumstances, it does not matter whether we view all assets as over- or undervalued because of an error that we make in estimating future income streams (for example), provided that the error is reproduced across all assets. We shall do the same and thus we focus here upon the third step, the discounting process. The next two sections are devoted to showing that the required rate of return provides the appropriate rate of discount.

#### 11.3.1 Valuing company shares

Ordinary company shares provide their owners with a perpetual claim upon the earnings or profits of a firm. What is actually paid to shareholders is known as a **dividend** and is variable. This variability results firstly from the fact that earnings themselves are variable; secondly, from the fact that other people and agencies (bondholders and the tax authorities, for example) have a prior claim on those earnings and the size of this claim may vary; thirdly, the firm may decrease (increase) its 'payout ratio' if it wishes to increase (decrease) the size of its retained earnings, to finance real investment. This variability, combined with the fact that shareholders' claims on residual assets rank low in the event of bankruptcy, explains why company shares are generally regarded as having comparatively high total risk.

However, since the dividend payment is a claim on earnings and earnings are expected to increase over time (as a result of real productivity gains and inflation), dividends in a well-managed firm usually show an upward trend over a period of years. Clearly, if dividend payments are not to become infinitely large relative to a share's price (or alternatively if there is some 'normal', long-run relationship between dividend payments and prices) it follows that a share's price will also follow an upward trend over a period of years. This capital appreciation may be a significant part of the total return on shares and thus a significant part of their attraction to investors.

The total return on company shares is thus made up of two elements, the **dividend yield** and the **rate of**



**capital appreciation.** The dividend yield is simply the current dividend ( $D$ ) divided by the market price ( $P$ ) while the rate of capital appreciation is the capital gain made from holding the share while its price rises. Strictly speaking, it is the difference in price at the end of the period compared with the price at the beginning expressed as a percentage of the price at the beginning. If we denote this difference by  $g$ , then:

$$g = (P_1 - P_0)/P_0 \tag{11.2}$$

and the total return can then be written as:

$$\bar{K} = D/P + g \tag{11.3}$$

A very simple rearrangement of Equation 11.3 gives us an expression for price:

$$P = D/(\bar{K} - g) \tag{11.4}$$

In equilibrium, therefore, given their dividend payments and growth prospects, the price of company shares depends upon the required rate of return. In Chapter 17 we shall see that Equation 11.4 is known as the Gordon constant growth model of share valuation. This is because we have implicitly assumed that  $g$ , the rate of capital appreciation, is constant. The treatment of the rate of capital appreciation is problematic and thus the Gordon model is just one of several we look at later, distinguished by the way in which they handle the growth issue. What they all share in common, however, is the presence of  $\bar{K}$ , the required rate of return in the denominator. Provided that this is the case then, with other things – dividend payments and growth – given, the price must *always* be determined by the required rate of return.

This is easily illustrated by substituting some plausible values in Equation 11.4. If, for example, a company, XYZ plc, were paying a dividend of 25p per share while the rate of capital appreciation were 15 per cent and the overall return required by shareholders were 22 per cent, then the share would be priced at:

$$\begin{aligned} &= 25\text{p} / (0.22 - 0.15) \\ &= 357\text{p} \end{aligned}$$

If now the required rate of return were to increase to 28 per cent, then the new price would be:

$$\begin{aligned} &= 25\text{p} / (0.28 - 0.15) \\ &= 192\text{p} \end{aligned}$$

A further example is provided in Exercise 11.1.

Figure 11.2 shows how we can interpret these changes in rates of return and prices in a supply and

**Exercise 11.1 Prices and rates of return**

Assume that a share pays a single, annual dividend ( $D$ ) and that the annual rate of capital appreciation is denoted by  $g$ , then we know that the annual rate of return,  $K$ , can be found from the expression:

$$K = D/P + g$$

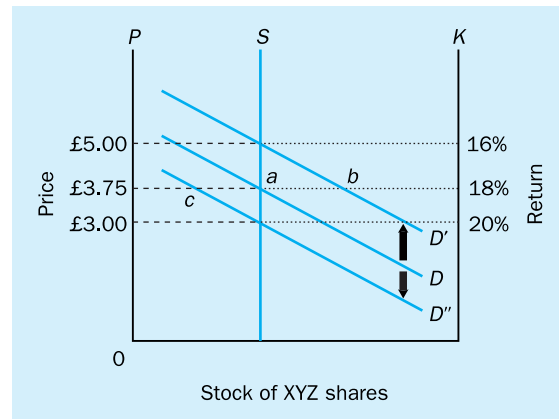
Suppose that the rate of capital appreciation is 10% p.a. and the dividend payment is 30p.

- 1 Find the current rate of return if the share's price is £3.75.
- 2 Find the current rate of return if the share's price were £5.00.
- 3 If the market thought a rate of return of 20 per cent appropriate, what would happen to the share's price?

(Answers appear in Figure 11.2 below.)

demand framework. Notice firstly that the supply of shares in XYZ is a *stock*. If XYZ were in process of issuing new shares, the stock would be expanding but with no new issues the existing stock remains available for trading. This is shown by the vertical supply curve,  $S$ , in Figure 11.2. (The values in Figure 11.2 are the answers to the questions in Exercise 11.1.)

The demand curve for XYZ shares is shown by  $D$ . It slopes downward on the basis that the lower the price of XYZ shares, *ceteris paribus*, the higher their rate of return and thus the greater the demand for them. The initial equilibrium is shown by the intersection of



**Figure 11.2** The demand for assets and their rate of return

the two curves and the equilibrium price is £3.75. (Notice that at this price the rate of return is 18 per cent.) At this price (rate of return) sell orders match buy orders.

Let us imagine now, as in Exercise 11.1, that the required rate of return increases to 20 per cent. Shares in XYZ are less attractive at any given price than they previously were. At the original price of £3.75 sell orders exceed buy orders. This is shown by the downward shift in the demand curve from  $D$  to  $D''$ . At the original equilibrium price of £3.75 the shortfall in demand is shown by the distance  $ac$ . The new equilibrium price, the price at which the existing stock is willingly held, in the sense that sell orders match buy orders, is £3.00.

Finally, suppose that there is an increase in demand for the shares. The demand curve shifts to  $D'$ . At £3.75 there is excess demand, shown by  $ab$ , and buy orders exceed sell orders. The price rises. Let us suppose that it rises to a new equilibrium of £5.00. At £5.00, Equation 11.3 tells us that the rate of return has fallen to 16 per cent.

In equilibrium, therefore, price settles at a level which equates the actual rate of return with the required rate of return. Notice that this equilibrium condition also implies that the firm's cost of capital is equal to the required rate of return. The cost of capital is the rate of return which a firm has to pay in order to raise additional funds. If the going rate of return on its existing shares is 16 per cent, then the cost of capital from a new share issue (ignoring transaction costs) is 16 per cent. In other words, the firm has to earn a 16 per cent return on its real capital which it then divides – paying some as dividends and retaining the rest to ensure a rate of growth adequate to make a total return to shareholders of 16 per cent. In equilibrium, the going rate of return and cost of capital will equal the required rate of return. This is important, since we can now see that changes in the required rate of return not only lead to changes in price but also to changes in the cost of capital and thus, presumably, in the allocation of new funds which will always seek the best return for a given level of risk. In Section 11.4, we shall see that if assets are indeed priced (and the cost of capital is determined) by the required rate of return as we have suggested here, then an argument can be made that resource

allocation is optimal. If asset prices and the cost of capital are not determined in the way described in this section, there are adverse implications for resource allocation. This possibility is explored in Section 11.5.

### 11.3.2 Valuing fixed interest bonds

Unlike company shares, fixed interest bonds provide their holders with a fixed income stream. In the UK, the income payments are known as **coupons**. Coupon payments can be expressed as a **coupon rate** by dividing by the par value of the bond. The coupon rate is often incorporated into the title of the bond alongside other information. For example, *Treasury 10% 2005* is a bond which pays £10 per annum to its holder and will mature (or be redeemed) in the year 2005. Notice that its **residual maturity** is the length of time from now to the redemption date. Its **original maturity** may have been very long (if it was issued many years ago) or it may have been quite short. We simply cannot tell. It is fortunate, therefore, that we are more interested in residual than original maturity. The income stream of such bonds amounts to a series of (known) coupon payments plus a terminal payment, which is also known and which is the redemption value of the bond. In these circumstances, the value of the bond is found by using the following expression (which we first met in Section 10.2):

$$P = \sum_{t=1}^n \frac{C}{(1+i)^t} + \frac{M}{(1+i)^n} \quad (11.5)$$

However, some fixed interest bonds have no redemption or maturity date. These are sometimes called **perpetuals** or **consols**. The value of bonds with no redemption date can be found by setting  $n_m = \infty$  in Equation 11.5.<sup>1</sup> With  $n_m = \infty$ , Equation 11.5 simplifies to:

$$P = C/i \quad (11.6)$$

**Irredeemable bonds** are rather like company shares with zero growth and we can see this if we compare Equation 11.6 with Equation 11.3. If we eliminate  $g$  and we substitute  $C$  ('coupon') for  $D$  ('dividend') then Equation 11.6 is the same as Equation 11.3, except that Equation 11.6 has  $i$  rather than  $K$  in the denominator. But a few moments' reflection reveals that  $K$

<sup>1</sup> See the appendix to this chapter for some further bond pricing arithmetic.

and  $i$  are equivalents: they are both rates of return and, in equilibrium, when the asset is fairly priced, both  $i$  and  $K$  will equal the required rate of return for their respective assets. For example, by rearranging Equation 11.6 we can see that:

$$i = C/P \quad (11.7)$$

and that  $i$  is thus the running yield calculated as the perpetual coupon payment divided by the price paid for the bond.<sup>2</sup> The question remains, however, ‘why, in equilibrium, are  $i$  (or  $K$ ) also required rates of return?’ This can be best answered by posing some other questions. ‘Why should they not be the rates that investors *require*?’ ‘If the assets can be easily bought and sold, why should investors accept a price which means that they do not get the return that they require?’ Surely, we must expect that if  $K \neq \bar{K}$  the price will readily adjust until the two are brought into equality. In *equilibrium* the price will be that which delivers the required rate of return. Looking at Equation 11.6, we can now see clearly why the price of bonds (and other assets) varies with changes in market interest rates. It is because the asset must be priced in such a way that it provides the required rate of return and one obvious reason why the required rate may change is that rates available on other assets in the market change.

As with company shares, therefore, the required rate of return is the appropriate rate at which to discount future income payments and thus, *ceteris paribus*, determines the **equilibrium price** of bonds. In the case of company shares, we used the capital asset pricing model to find the required rate of return. The CAPM says that the required rate is equal to the risk-free rate of interest plus a risk premium derived from comparing the riskiness of the asset with the riskiness of the whole market portfolio. We can also use the CAPM to find the required return on bonds. The theory behind the CAPM requires that we derive a  $\beta$ -coefficient for any risky asset by comparing the variance of returns on the asset with the variance of returns on the ‘whole-market’ portfolio. Interestingly, the extent to which bond prices fluctuate in response to changes in market conditions depends to a large extent upon their residual maturity. The price of bonds with a long residual maturity is more sensitive to

### Exercise 11.2 Bond pricing

Assuming that the required rate of return is 8% p.a., find the equilibrium price of:

- 1 a 6% bond maturing in four years time;
- 2 a perpetual 6% bond.

Calculate the new equilibrium prices if the required rate of return rises to 9% p.a.

Note: (1) requires the use of discount tables.

(Answers appear in the text below.)

changes in interest rates than is the price of short-dated bonds. We shall explore this more fully in Chapter 16, where we show that the concept of *duration* measures the interest-sensitivity of a bond’s price with respect to changes in interest rates. We have already met the idea in Section 10.2, where we worked an exercise to show that the longer the maturity of an asset the more variable its price in response to a change in interest rates. For the moment, however, one can grasp the basic idea that price sensitivity varies positively with the term to maturity by remembering that bonds pay a series of *fixed* coupons. Thus when market interest rates are falling there is an advantage in receiving fixed payments, and the more fixed payments the greater the advantage. When interest rates are rising, fixed payments are less attractive and the more fixed payments there are, the greater the disadvantage. Thus, when interest rates change, the impact on price is greater for long-dated bonds. The effect of duration can be seen again in Exercise 11.2, which is an exercise in the pricing of two bonds with identical characteristics except that one has a residual maturity of four years while the other is irredeemable.

An irredeemable bond is simply a bond of infinitely long residual maturity. In Exercise 11.2 we see that a one-point rise in required rates of return causes a fall in the equilibrium price of the irredeemable bond from:

$$£75 (= £6/0.08) \text{ to } £66.66 (= £6/0.09)$$

while the price of the ‘short-dated’ bond falls from:

$$£93.37 (= £5.56 + £5.14 + £4.76 + £4.41 + £73.50)$$

<sup>2</sup> The demonstration is more complicated for a **redeemable bond**, since ‘yield’ for redeemable bonds has several meanings. We shall see in Chapter 16 that  $i$  in Equation 11.5 is known as the *redemption yield* (and that it is not easily calculated). We shall also see, crucially, that the redemption yield is the discount rate that makes the cashflows over the life of the bond equal to its price.

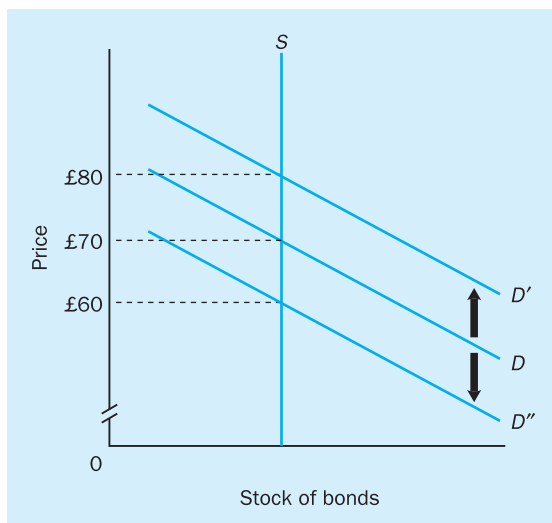
to:

$$£90.27 (= £5.50 + £5.05 + £4.63 + £4.25 + £70.84)$$

The change in price of the irredeemable bond is £8.34 while the price change for the short-dated bond is only £3.10. The risk attaching to a bond, therefore, is contained in the interest-elasticity of its price and this in turn results largely from its duration.

We shall come back to the issue of duration and its relevance to bond prices in Chapter 16. For the moment, we only need to appreciate that, in equilibrium, bond prices, just like the prices of any assets, must adjust so as to provide their holders with the required rate of return and that this required rate of return will be equal to the risk-free rate (of appropriate maturity) plus a risk premium. For an individual bond, therefore, anything that changes the level of risk-free rates, or the general level of risk aversion in the market or the riskiness of the bond itself, will cause a change in the rate of return required and thus in the equilibrium price.

Figure 11.3 shows how we can interpret these changes in a bond's rate of return and its price in a supply and demand framework, just as we did with a company share. The supply of a bond available for trading is a *stock* and is shown by the vertical supply curve, *S*. The demand curve, *D*, is drawn downward-sloping to indicate that, *ceteris paribus*, the lower the price the greater the quantity of a bond investors will wish to hold because, as we know, the lower the price



**Figure 11.3** Bond prices and shifts in demand

### Exercise 11.3 Bond prices and yields

Assume that Figure 11.3 depicts the market for a 7% irredeemable bond.

- 1 What was the required rate of return at the original equilibrium price of £70?
- 2 To what level did the required rate rise to cause the equilibrium price to fall to £60?
- 3 To what level did the required rate fall to cause the equilibrium price to rise to £80?

(Answers appear in the text below.)

the higher the rate of return. In Figure 11.3, the initial equilibrium price is £70. Suppose now that market interest rates rise. Amongst the interest rates to rise will be the risk-free rate and this in turn raises the rate of return required on this bond. Investors are no longer willing to hold the stock of bonds while the rate of return is that rate generated by a price of £70. Sell orders exceed buy orders and the price falls. In Figure 11.3, the demand curve shifts downward to *D'* and the new equilibrium price – the price which yields an appropriate rate of return – is shown as £60. If, by contrast, market interest rates fell, the required rate on all bonds would fall. At £70 the bond in Figure 11.3 would yield a rate of return which exceeded that available elsewhere. This would encourage an excess of buy orders over sell orders which we would show by an upward shift in the demand curve to *D''*. The new equilibrium price is shown as £80. Exercise 11.3 requires the calculation of rates of return associated with each of these levels of demand.

The rate of return on a 7% irredeemable bond trading at £70 is 10 per cent. At £80 the rate of return falls to 8.75 per cent while at £60 the rate of return is 11.67 per cent.

Again, as with company shares, changes in the required rate of return are not only determining prices but also the cost of new funds. A firm whose 7% bonds currently trade at £70 must issue new bonds which (ignoring issue costs) bring in £70 for a commitment from the firm of £7 paid per year (or alternatively bring in £100 for a commitment of £10). If the bond's price falls to £60, new £100 bonds will not be bought unless the firm is willing to pay at least £11.67 for every £100 raised by the sale of those bonds.

### 11.4 The 'fundamentals' of asset valuation

The account that we have so far given of the determination of rates of return and of asset prices is a very orthodox or conventional one. In orthodox theory price adjusts in order that the asset provides the rate of return required by investors. When this condition is met, an asset is said to be *fairly valued* and its price equals its 'fair' or 'fundamental' value. This rate of return is derived from the risk-free rate of interest and a risk premium, and the latter in turn is equal to the quantity of undiversifiable risk attaching to the asset multiplied by the price of undiversifiable risk as set by the market for risky assets as a whole. Any change in these components changes the required rate of return and, *ceteris paribus*, the price of the asset. The reason that the price must adjust is that we assume that in the short run the income stream is unchanged. Thus, if we take shares as an example, we are assuming that dividend payments are fixed (by the performance of the company) and that the growth rate of dividends is also fixed (by the growth in productivity of the firm's assets).

Notice two features of this account. Firstly, *price is the dependent variable*. It is the price that adjusts in order to satisfy investors' requirements for a return. Secondly, the rate of return (and therefore the price) is the outcome of a *rational* process. That is to say that every element in the story can be explained by economic agents trying consistently to maximize the benefit from some *real* economic activity. Figure 11.4 brings together the whole picture as we have developed it in the last four chapters. It uses share prices as an example. We look at the schema first and then try

to show how each of the elements can be presented as the outcome of a rational process.

Reading from left to right, the figure reminds us that the required rate of return is equal to the risk-free rate ( $K_{rf}$ ) plus the quantity of risk ( $\beta$ ) times the market risk premium ( $K_m - K_{rf}$ ). This is the CAPM (from Section 8.6). The (nominal) risk-free rate of interest ( $i$ ) is made up of a real rate of interest ( $r$ ) (Section 9.3), an inflation premium ( $\pi$ ) (Section 9.3) and a term premium ( $l$ ) (Section 10.2). This is the outcome of the interaction of the supply of and demand for loanable funds in conditions of zero risk, occasionally modified by central bank policy decisions. It is primarily the result of lenders trying to maximize their return from surrendering a current claim to consumption and borrowers trying to maximize the return from the projects in which they invest borrowed funds.

The risk premium on a whole market portfolio ( $K_m - K_{rf}$ ) is the return required over and above the risk-free rate by investors endeavouring to maximize return while minimizing risk. The market risk premium is what they demand for a portfolio from which all diversifiable risk has been eliminated (Section 8.5).

In equilibrium, the required rate must be matched by the actual rate of return and for company shares this means the sum of the dividend yield ( $D/P$ ) and the earnings growth rate ( $g$ ). The dividend available to shareholders depends upon the profit made by the firm and this depends upon the productivity of the underlying assets which constitute the real capital of the firm and the price which consumers are prepared to pay for the output from that capital equipment. In a perfect world, the price that the community is prepared to pay represents the addition to total welfare provided by the marginal unit of output. Provided that price is just equal to this marginal benefit, then

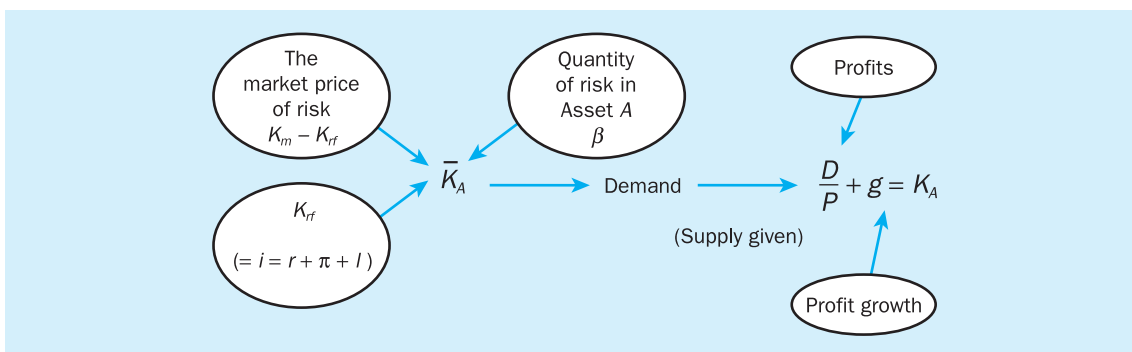


Figure 11.4 The capital asset pricing model

total welfare is being maximized by the output from these assets and shareholders are earning a just reward for their contribution to satisfying these needs. The growth in dividends depends upon the rate of growth of productivity of the underlying assets, a rate which depends upon the firm's management's ability to follow a sound policy of reinvestment and to manage the assets. In the short run, all of these are given, except price.

Price is thus the dependent variable which adjusts in order to meet the requirements of a 'rational' process. Because the rationality lies in the behaviour of agents engaged in *real* economic activity, we tend to describe these determinants of a share's price as its **fundamentals**. If  $P$  is determined by  $\bar{K}$  (given  $D$  and  $g$ ) we say that price is determined by the underlying fundamentals.

### 11.5 An alternative interpretation

Before leaving this section of the book, however, it is worth pausing to reflect on the overall picture that we have drawn and to consider how well it, or its implications, reflects the reality which we think we see.

The first point to make perhaps is that where tradable financial assets are concerned, the dominant discourse concerns *prices* and not rates of return. It is true that newspapers report and commentators discuss deposit accounts and insurance and pension policies in terms of rate of return. But where an asset is tradable almost all comment relates to its recent, latest and next-most-likely price movement. Rates of return are just not part of the conversation.

The *Financial Times* interest in the Hilton Group as reported in Box 11.1 shows this quite well. First of all it tells us that the share *price* has almost doubled in the last year. It then goes on to consider how the current price compares with the price of other hotel/leisure groups. The comparison is done by looking at the 'prospective p/e' meaning the price one has to pay per unit of profit, given current profit expectations. The current price of Hilton Group shares (260 p) is about 16 times the amount of profit that the shareholder is buying, slightly less than one would have to pay for the same amount of profit in rival groups. The note finishes by suggesting that this discount could disappear if the number of US visitors to Europe returns to normal. Notice also that while the report is pre-occupied with *price* rather than rate of return it focuses upon the *relative* price rather than the *absolute* price. The issue for the *Financial Times* is only whether Hilton's price is 'high' or 'low' compared with the price of shares in similar leisure groups. This is another common characteristic of share price evaluation as it is carried out in practice. But if we were really convinced that there is a specific rate of return which is correct for Hilton Group, bearing in mind the fundamentals, then this rate of return would produce a unique *absolute* price: a price which is fair for the firm given its characteristics, *regardless of what prices may be attached to similar firms*.

This may not be significant. It may be that everyone discussing asset prices automatically carries the corresponding rate of return in his or her head and talks only of 'price' because it is more convenient than 'rate of return'. On the other hand, it may be that the financial community talks in price terms because price

#### Box 11.1 Good gambling news proves a winner for hotel group



Hilton Group, which owns the rights to the Hilton brand outside the US and operates about 400 hotels in more than 75 countries, is on a three-star rating. The shares have almost doubled in the past 12 months, with the most recent rise prompted by revived broker suggestions that Hilton should hive off its 2,300 Ladbroke betting shops, which represents 80 per cent of profits. It pushed the prospective p/e – based on 2004 earnings per share forecasts of 15.7p – to 16 times, a slight discount to the sector. Hilton insiders do not believe that split will happen but the shares have been driven by positive news in the gambling industry – the removal of betting tax and the liberalisation of fixed-odd betting machines. And just as those aspects start to be discounted in the price, the cyclical recovery of the hotel industry is getting into gear. The latest survey by Deloitte showed London was booming and the consultancy expects the effects to ripple out across the UK and Europe. The slight p/e discount may reflect the continuing caution of US visitors and their return could provide that extra star. **Peter John**

Source: Peter John, *Financial Times*, 24 April 2004.

is genuinely more interesting, and not simply the reciprocal of a rate of return. This is not a silly idea; one can see why it could happen. For example, if we go back to our share valuation formula, Equation 11.3, we can see that a price change is part of the rate of return. In the long run, dividends increase ( $g$  is positive). If dividend yields are not to rise to infinity (that is  $D/P$  is stationary) then  $P$  must also rise. And we all know that investors are in practice very interested in the capital appreciation of shares which may well be a larger part of the total rate of return than the dividend yield.

But we know that prices change because of changes in demand, whatever may be the ultimate cause of the demand shift. A shift in demand causes a change in price just as effectively if it is the outcome of a (false) rumour about a change in interest rates as it does when it is the outcome of an actual change. And once we separate the desire to buy or sell from actual events and link it to *expectations* of events we open the door to the possibility that demand may shift in response to a very wide range of forces, ranging from those that might be more or less rational in origin to those that have no logical connection with asset values.

Let us think about some possibilities, beginning with events which are strictly rational (in the sense we are using here) and then moving towards the more fantastic (but not impossible). An *actual* change in the risk-free rate of interest causes a change in asset prices because it changes the demand for the asset by changing the present value of its future income stream by changing the rate at which we discount that future income stream. Holding the asset when the interest rate changes thus leads to a capital gain (a positive contribution to the overall rate of return) or a capital loss (a negative one). It makes sense, therefore, for investors to try to anticipate changes in interest rates. In these circumstances, demand will shift, and prices will change when agents *expect* a change in interest rates. An *expected* event causes an *actual* event. For an individual investor, however, making a capital gain or avoiding a capital loss does not require a belief or expectation that interest rates will change in the very near future. It requires only a belief (or expectation) that other investors believe or expect that interest rates are going to change and that they are going to buy or sell on the strength of that expectation. Indeed,

it is not necessary even to believe that other investors believe that interest rates are going to change but only that other investors are going to buy (or sell) *for whatever reason*. This gives rise to two features of investor behaviour, one of which is certainly observable, while we cannot be sure about the second. The first is the sensitivity of demand (and price) to actual events which might help to predict interest rate changes. This often involves forming an implicit government policy reaction function. For example, if investors know that the government is particularly concerned about the rate of growth of credit and the build-up of inflationary pressures, the announcement of a big rise in bank lending causes asset prices to fall because investors make the connection between an undesirable credit surge and the likelihood of a rise in official interest rates to try to stop it. In small open economies, changes in the balance of trade often cause asset price changes through the same (interest rate anticipation) mechanism.

The other feature of investor behaviour which follows from wanting to participate in capital gains and avoid capital losses is the apparent 'herd' behaviour which leads a rising asset price (for example) to go on rising even after any fundamental reason for an increase has ended. A situation where this happens is known as a **bubble**. Sometimes, as with the Big Bull Market in the United States, 1928–29, the buying behaviour affects the whole market. The 1987 crash might be an example of herd selling. The technology stock boom and slump in 2000/01 (see Case Study 2) certainly showed aspects of herd behaviour. It is not possible to be absolutely sure whether investor behaviour corresponds to that of a bubble merely by observation. It is always possible to argue that the market's aversion to risk is diminishing or that investors genuinely think that future growth in productivity is going to be much higher than in the past (a lower  $k$ , higher  $g$ , remember). Or, alternatively, that they genuinely think that the fundamentals are getting very rapidly worse. It is, though, hard to believe that fundamentals or even people's perception of the fundamentals of asset values could change so much and so rapidly during the great booms and crashes of asset prices. It is very tempting to think that investors are looking after their own short-term self-interest by sticking with the herd.<sup>3</sup> As John Maynard Keynes

<sup>3</sup> Another point to remember is that once we recognize the importance of 'perceptions' we should also recognize that people's perceptions are influenced by emotions. Good news in the present may make us more optimistic about future events which *have no rational connections with the good news*. In the first half of 1994, for example, the Italian bond market showed little clear trend, but it rose sharply after the Italian football team won the World Cup. (We are grateful to Simon Maggs for drawing our attention to this incident.)

once famously remarked, ‘it is not sensible to pay 25 for an investment of which you believe the prospective yield to justify a value of 30, if you also believe that the market will value it at 20 three months hence’ (Keynes, 1936, p. 155). Indeed, if you were a fund manager who insisted on dealing in assets on the basis of their fundamentals when everyone else was buying in a bubble and making large profits, your clients could accuse you of negligence.

If it *is* true that investors in tradable assets are sometimes buying and selling on the basis of what they expect the price to do in the very near future, rather than on the rate of return offered by the asset, then Figure 11.4 gives a misleading picture. Causalities are reversed. Investors are aiming at a target price for the asset and the rate of the return becomes the dependent variable. In the world we have just described, buying and selling drives the price, as it always does, to an equilibrium where sell orders match buy orders, but the rate of return, instead of determining this price, is itself determined by it.

Which of the two pictures we have just described is the more accurate is an important issue. The rational determination of prices by the required rate of return is essential if resources are to be allocated efficiently as we described in Section 1.5.3. We said there that the return to investors was just enough to compensate them for surrendering their ability to purchase real resources plus whatever degree of risk was involved in so doing. The rate of return that they required was the cost of capital. The fact that consumers were ultimately prepared to pay a price for the goods produced by the real capital assets financed by investors indicated that their welfare gain from the goods produced just matched the sacrifice of the providers of finance. No *net* benefits could result to society by changing either the volume of investment or its composition.

This happy situation is not the outcome if people buy assets just because the price is rising (or sell just because the price is falling). In these circumstances the return to investors could settle anywhere and, where it settles, the cost of capital also settles. For example, take the case where a company’s share price rises on the rumour of some new product development and, even when the rumour subsides, the price goes on rising because investors are impressed by its recent capital appreciation. Perhaps its price before the rumour was £2 and the dividend payment was 8p per share. The dividend yield was 4 per cent and this was the cost (in terms of dividend per pound raised) of raising new capital by issuing new shares. Suppose that after

a few weeks’ buying the price settles at £3. If the firm now decides to raise new capital by issuing new shares then the cost (in dividend per pound raised) is now 8/300 or 2.66 per cent. In the circumstances, the firm may be encouraged to expand, though there is no indication that the benefits to society from the output that it produces have increased. Furthermore, the firm’s enhanced share price makes it easier for it to make a bid for other firms (by issuing some of its own shares to shareholders of the target firm). There are resource allocation arguments in favour of takeovers. For example, a poorly performing firm, if correctly valued, will have a low share price and will be a target for more efficient firms which will bring their more efficient management to the poorly performing firm. But where a firm is valued as the result of a bubble, its price is no longer an indication of superior performance. We cannot then expect that benefits will follow if it takes over a firm which is priced more cheaply – but correctly.

## 11.6 Summary

The present value of an asset is equal to the sum of the future stream of income payments that it provides, each payment suitably discounted. The rate of discount is also the rate of return on an asset and so the appropriate rate of discount is the *required* rate of return. In equilibrium, the asset’s price will equal its present value and its actual rate of return will equal the required rate of return.

The required rate of return is given by the risk-free rate plus the quantity of undiversifiable risk multiplied by the market price of risk. An asset whose price is determined according to these principles is said to be priced according to its fundamentals since the determinants of its price all reflect the rational decisions of agents engaged in real economic activity. If assets are priced according to these principles, a case can be made that capital is being allocated in an optimal way.

However, there are occasions when asset prices behave in a way that suggests that other forces are at work. It is hard, sometimes, to believe that the fundamentals of an asset’s value change so fast or so much that they can account for dramatic changes in asset prices. In these circumstances it is tempting to think that price takes on a momentum of its own. Instead of the required rate of return determining the price, the



price is driven by some herd-like behaviour on the part of investors with the result that the rate of return becomes the dependent variable and may settle

anywhere, with no rational foundation. In these circumstances, we cannot be sure that capital is being allocated efficiently.

### Key concepts in this chapter

Tradable assets	Coupon rate	Actual rate of return
Non-tradable assets	Original maturity	Required rate of return
Present value	Residual maturity	Actual price
Dividend	Redeemable bonds	Equilibrium price
Dividend yield	Irredeemable bonds	Fundamentals
Capital appreciation	Perpetuals	Bubbles
Coupon	Consols	

### Questions and problems

- Imagine that the central bank raises short-term interest rates. Discuss and explain the effect on:
  - the rate of return required by investors in bonds;
  - the price of ordinary company shares.
- Suppose that investors expect inflation to increase in future. Explain the likely effect on bond prices. (You may wish to refer to Figure 10.1.)
- How would a fall in interest rates affect the required rate of return on securities? Using a supply and demand diagram, show the effect of this fall upon the equilibrium price of a security.
- You are advising a friend who holds company shares whose return plots below the security market line (see Chapter 8). Would you advise your friend to hold or to sell? Explain your answer.
- Imagine a security whose price has been unchanged for several days. What does this stable price imply about the buying and selling of that security?
- Suppose that you decide to take a round-the-world cruise and that you will pay for this by
  - selling bonds and
  - withdrawing your
 savings deposits from a bank. What effect does (a) have on the total quantity of bonds in existence? What effect does (b) have on the quantity of savings deposits? Explain any difference.
- Explain the basic principle underlying the valuation of any asset.
- How would you expect the price of (a) a short-dated bond and (b) a long-dated bond to be affected by a given increase in market interest rates? How would you account for any difference?
- What do we mean when we say that an asset is priced according to its 'fundamentals'? In what sense might it be argued that securities priced according to fundamentals are priced according to rational principles?
- From the financial press, collect some recent reports of security market behaviour. Do those reports suggest to you that price changes are driven by changes in desired rates of return or by expectations of future price changes?
- Suppose that you hold shares in a company whose future profitability you think is likely to decline, but you see that these shares are still being recommended for purchase in the financial press. What would you do?

## Further reading

D Blake, *Financial Market Analysis* (London: McGraw-Hill, 2e, 2000) Ch. 13

E J Elton and M J Gruber, *Modern Portfolio Theory and Investment Analysis* (Chichester: John Wiley, 5e, 1995) Chs. 18, 20

P G A Howells and K Bain, *Financial Markets and Institutions* (London: Longman, 4e, 2004) Ch. 6

P John, 'Good gambling news proves a winner for hotel group', *Financial Times*, 24 April 2004

J M Keynes, *General Theory of Employment, Interest and Money* (London: Macmillan, 1936)

F Mishkin, *The Economics of Money, Banking and Financial Markets* (New York: Pearson, 7e, 2004), Ch. 7

S Pressman, 'What do capital markets do, and what can we do about capital markets?', *Economies et Sociétés*, June 1996

## Appendix to Chapter 11

When  $n_m$  is small, Equation 11.5 is fairly easily solved. However, when  $n_m$  is large, calculating the present value of a stream of coupon payments can be tedious. Thus, it is worth remembering that the present value of a stream of income payments can alternatively be written as:

$$\frac{C}{i} \left( 1 - \frac{1}{(1+i)^{n_m}} \right)$$

Substituting this into Equation 11.5, we can then find the price more easily as:

$$P = \frac{C}{i} \left( 1 - \frac{1}{(1+i)^{n_m}} \right) + \frac{M}{(1+i)^{n_m}} \quad (\text{A11.1})$$

Note also that if  $n_m = \infty$ , the value of

$$\frac{1}{(1+i)^{n_m}} = 0$$

and

$$\frac{M}{(1+i)^{n_m}} = 0$$

Hence the value of a perpetual bond is:

$$\frac{C}{i} (1 - 0) + 0 = \frac{C}{i} \quad (\text{A11.2})$$



Part 4

# Money and Banking



## Chapter 12

# Banks and the supply of money

### *What you will learn in this chapter:*

- The essential characteristics of money
- Why monetary assets are difficult to identify
- Which assets are officially classified as money
- How changes in the money supply are reflected in banks' balance sheets
- How to analyse changes in the money supply through the monetary base and flow of funds models of money supply determination
- The range of techniques available to the authorities for the purposes of money supply control

## 12.1 Introduction

In the next two chapters we turn our attention to banks and the supply of and demand for money. There are four reasons for this.

Firstly, banks themselves form one particular subset of financial intermediaries. In most developed countries they also make up a *large* subset of financial intermediaries and so they are worth studying for this reason alone.

Secondly, the liabilities of banks are the principal components of any country's money supply and so the behaviour of banks is intimately connected with changes in the supply of money. We pointed out in Section 1.5.1 that one general effect of any increase in financial intermediation is the creation of liquidity, but if the increased activity involves primarily banks, then the increase in liquidity takes the specific form of 'money'.

Thirdly, many economists take the view that changes in the money supply have important effects upon the economy, especially if the changes are large or sudden. *Exactly* what these effects may be, and whether they have an impact in the short run or in the long run and whether the effects are temporary or permanent, are matters of controversy. But the fact remains that whatever version of this view one accepts, bank behaviour may have effects upon the economy which are rather different from those of other intermediaries.

Fourthly, even if one doubts the importance of money in the economy, anyone interested in finance has to recognize that governments and central banks certainly behave as if it matters. Thus they tend to adopt policies which set at least broad limits to the desirable rate of monetary growth and then take such action as they can to keep monetary growth within those limits. This leads them invariably to make changes to short-term interest rates (as we saw in Section 9.4) – raising them to reduce monetary growth, for example.

For all these reasons, therefore, the behaviour of banks is an important issue. In this chapter, we concentrate upon questions which are related to the theme of money *supply*. This leads us to consider what money is, how the components of the money supply change

over time, how money is created and finally what the authorities can do to control its creation.

In Chapter 13, we shall focus upon questions which are related to the theme of money *demand*. This leads us to consider how people decide how much of their wealth to hold in monetary form and how their behaviour is affected by a mismatch between the quantity of money available and the quantity they wish to hold. It is here that the controversy about the effects of changes in money supply have their origin. People may respond in ways that have little lasting effect upon the economy, or their attempts to adjust to monetary shocks may be very important. This behaviour is summed up in what is known as the 'transmission mechanism'. In Chapter 14 we shall look at what governments have thought about the importance of money at various times and how these views have been reflected in policy.

## 12.2 The definition of money

### 12.2.1 Some general principles

One traditional way of defining money is to look at what it does, or what we require it to do, and then to see what in practice we use for that purpose. We shall do that in a moment but first let us begin by clarifying some important terms which sometimes cause confusion in discussions of what money is.

We begin with *real wealth*. Wealth (alternatively called *capital*) is a *stock* of assets, including human capital, which can be used to produce a *flow* of goods and services over a period of time. Thus we are all familiar with the idea that we use some of our human capital (in the form of labour) each year in order to produce a flow of new goods (books, computer programs, mobile phones and so on) or services (such as lectures or taxi rides) each year. In any year, we shall consume, that is, use up, a large proportion of the income we produce. The rest is saved. We shall also use up a proportion of wealth in the production of that income. Clearly, wealth consumed or used up in the production of income must be replaced each year or the production process must eventually grind to a halt.<sup>1</sup> Saving is an addition to wealth. If saving is sufficient to replace

<sup>1</sup> (Real) income was famously defined by Hicks (1946) as all that output that could be consumed while leaving us as well off at the end of the period as the beginning. This is restating what we have said, with different priorities. Looking at total output, Hicks insists on deducting sufficient saving to *ensure* that wealth is unchanged. What is left is income which can be consumed or some further saving may be carried out, adding to future wealth.

the wealth consumed then we say that *net investment* is zero. If saving exceeds the consumption of wealth then we have positive net investment. Our real wealth increases and opens up the possibility that more of it may be devoted to production in future. The real economy expands. All of these concepts, wealth, capital, income and saving, are expressed so far in *real terms*. That is to say we are talking about *volumes* of goods, services and skills. These volumes determine what we can *really* consume, save, invest and so on. It is these volumes that *really* matter to our welfare. Whatever price or value we place upon these volumes makes no difference to their quantity and no difference to our real welfare.

In everyday language, however, we think and talk about income, saving, wealth and so on in **money terms**. We shall see just why that is in the next paragraph. But it is important to be absolutely clear that ‘money’ is merely some token in which we choose to reckon these magnitudes and use to carry out exchanges. Classical economists used to describe money as a ‘veil’ – meaning something which partially hid what was really going on, but which had no effect upon it. In Section 13.3 we shall see that it might be going too far to say that the quantity of money available has no effect at all on real behaviour but it is crucial at this stage to realize that ‘money’ is something that exists quite independently of the real goods and services, income, wealth and so on which it is being used to measure or exchange. Consider now why ‘money’ is so intimately connected with the measurement and exchange of goods and services that there is sometimes a danger of confusion.

Firstly, when it comes to measuring the *total* volume of production, income, saving, wealth and so on we require some common standard in which to express them. In other words, we need a **unit of account**, and that is provided by ‘money’. Thus we may talk of this year’s national income as £900bn and we may forecast that over the next year it will grow to £920bn.

Furthermore, while it may be true that the production of real goods and services determines our real income and the amount that we can save and add to real wealth, we do not individually consume what we produce. Typically, we sell our labour to employers

who organize production and pay us wages and salaries in the form of ‘money’ which they in turn receive from buyers of the goods and services or by borrowing. What this tells us is that modern economies are ‘exchange’ rather than ‘barter’ economies. This brings us to another function of money, which is its use as a **medium of exchange**. The movement from barter to the use of money brings with it a large saving of resources. These gains, which come under the general heading of seigniorage,<sup>2</sup> include a large reduction in the information costs involved in comparing relative prices of goods and services throughout the economy.<sup>3</sup>

The movement from barter to exchange, using money, brings also a greater flexibility from being able to separate income and consumption decisions in time. In a barter economy, a decision to save would mean setting aside something that one had produced in the hope that it might be useful at some time in the future or, alternatively, exchanging it now for some other good again in the hope that it might turn out to be what one needed. With money, one can decide to save now, in the knowledge that those savings will definitely be needed at some time in the future but without knowing exactly when, or in exactly what form or for what purpose. When the time comes, the savings, in money form, can be converted into whatever is required. Because saving (adding to wealth) is being carried out by holding ‘money’, money is said here to be functioning as a **store of wealth**.

Finally, in a monetary exchange economy, it is often advantageous to carry out exchanges and payments at different times. Clearly, it is not much benefit to households to arrange a daily delivery of milk or newspapers to their home if they are required to go to the dairy or newsagent every day to pay for the milk or newspapers. One of the many benefits of a monetary economy is the availability of credit. But credit will only be possible if there is some form in which debts and credits can be recorded to everyone’s satisfaction and if there is some acceptable form in which the debts can be finally extinguished. We know, of course, that debts are recorded in money form (money’s role as a unit of account again) and it is accepted that they will eventually be settled using ‘money’. This is money acting as a **standard of deferred payment**.

<sup>2</sup> *Seigniorage* may be defined as the gains which accrue to the issuer of a currency because the issuer (a government, for example) obtains real resources in return for non-interest-bearing, non-repayable debt.

<sup>3</sup> Information costs involved in a non-monetary system can be reduced by the development of more sophisticated forms of barter. Nonetheless, costs within a barter system remain very high.



These – the unit of account, medium of exchange, store of wealth and standard of deferred payment – are the roles that money is traditionally said to perform. The major ones, by which we mean that they may be a means whereby money may have some effect upon the rest of the economy and about which there is certainly some controversy, are the medium of exchange and store of wealth functions. The next question is: ‘does identifying these functions enable us to identify “money”?’

So far as the unit of account, medium of exchange and standard of deferred payment roles are concerned, it seems very clear that ‘money’ must be something which is universally acceptable. What it is that makes one asset in particular universally acceptable is an interesting question which has fascinated economists over the years. One can lay down certain physical essentials – it must be cheap to produce, highly divisible and convenient to carry – but an asset could have all these qualities and still not function as money. One can appeal to official regulations. Most countries define certain assets as **legal tender**, meaning that people *must* accept them in exchange. In the UK, for example, notes and coin are defined as legal tender, at least for transactions of specified type. But most transactions (by value) are carried out in most economies by a much wider range of assets. The dominant medium of exchange in most economies is bank deposits. One might argue that these are made acceptable by the understanding that they are fully convertible on demand into legal tender and that legal tender itself is ultimately guaranteed by the state. It seems hard to imagine, however, that if the idea of legal tender were to be abandoned bank deposits would cease to function as the main medium of exchange.

Money’s ability to function as a store of value does not rely so heavily upon its general acceptability but requires another characteristic which may also be important in making it acceptable. This is stability in its value. To be persuaded to use money as a store of value, people must be persuaded that its future purchasing power will be little different from what it is now. At the very least, people will wish to be assured that there is not a general tendency for its purchasing power to diminish. This requirement may not be absolute. Since money yields numerous benefits, it will not lose its attractiveness, even as a store of value, until the rate of depreciation reaches such a pace that

it outweighs the benefits. Such rates have, of course, been reached at various time and places. The Weimar Republic and Hungary in the 1920s, some Latin American states in the 1970s and perhaps Russia in 1994–95 yield examples of what happens when confidence in the currency finally collapses because of doubts about its future purchasing power. Those that can do so move their savings out of the country (adopting dollars or Deutschmarks as alternative stores of value) and exchange takes place using alternative commodities.<sup>4</sup> It is to avoid situations like this, and the disruption to trade that follows, that governments and central banks place such emphasis upon minimizing inflationary pressures. In conditions of hyper-inflation, no amount of legislation about ‘legal tender’ will make the official currency acceptable.

The important lesson that we must draw from this ‘acceptability’ criterion is that it does not provide a timeless definition of ‘money’. What is widely acceptable now was not generally acceptable even 100 years ago. Indeed, there was a time when people were reluctant to accept government issues of notes and coins of low intrinsic value. Defining token money as ‘legal tender’ was initially introduced by monarchs and governments which wished to enjoy the seigniorage benefits of issuing token money of low intrinsic value but found that their subjects were reluctant to move away from gold and silver coins.

More importantly for us, however, is that the acceptability criterion means that ‘money’ continues to change. This in turn poses problems for authorities wishing to control the amount of money in circulation – especially if they try to do it by ‘direct’ or non-price methods of control. In most economies, the general public, banks and other financial institutions have become very adept at developing money substitutes. In the next section we shall see that there have been major changes in official definitions of money in recent years and that these have been necessary because of changes in private sector behaviour.

### 12.2.2 Official definitions

In this section we look at the assets which various monetary authorities choose to recognize as components of their money stock. What is apparent for each

<sup>4</sup> Quite often cigarettes, since they meet the criteria of divisibility and low carrying costs.

**Table 12.1** Money definitions in the eurozone end January, 2004

Name	Components	Size (€ bn)
Reserves	Currency with monetary financial institutions (MFIs) + MFIs' holdings of deposits with the central bank	133.6
M1	Currency in circulation outside MFIs + non-MFIs' holdings of sight deposits	2,712.7
M2	M1 + non-MFIs' holdings of time deposits	5,259.1
M3	M2 + non-MFIs' holdings of repurchase agreements, money market instruments and bonds with <2 years to maturity	6,155.6

Source: *Monthly Bulletin*, March, tables 1.4 and 2.3, Frankfurt am Main, European Central Bank (ECB, 2004), information can be obtained free of charge from the ECB, in particular from [www.ecb.int](http://www.ecb.int)

country is that money can be defined ‘narrowly’ or ‘broadly’. The normal practice is to attach numbers to these official magnitudes using the lowest numbers to refer to the narrowest magnitudes. In the next four tables we describe the national definitions of money currently in use in the eurozone and the USA. We also give the recent magnitudes of the various components of the monetary definitions so that the approximate proportions can be seen. In an ideal world, the definitions would be consistent across countries, and we shall see in a moment that there are indeed some similarities. But there are some significant differences of detail and these illustrate very clearly what we saw in the last section, namely, that which assets function as money depends upon their acceptability in that role. This in turn depends upon the particular history and monetary institutions of each country. The fact that the old broad money definition in Germany excluded building society deposits, while in the UK they are included, is a reflection of the different way in which people treat these deposits.

The narrowest definition of money is that which makes up the **monetary base** or **high powered money**. This consists of notes and coin (or ‘currency’ or ‘cash’ as it is sometimes called). Most monetary aggregates include assets held only outside banks (that is, by the ‘non-bank private sector’ or simply ‘non-banks’ as we describe them in the tables). But the monetary base is unique in including cash held both by non-banks and in the vaults of the commercial banking system. It also

includes commercial bank deposits at the central bank. The name ‘high powered money’ is derived from the base: multiplier model of money supply determination (see Section 12.4). In this model, the monetary base forms a stock of highly liquid potential ‘reserves’, on the basis of which commercial banks can create **broad money** as a multiple of the monetary base.<sup>5</sup> Since the multiple is often very large, this model predicts a large change in broad money from a small change in the base – changes in the base thus appear very powerful.

The next monetary aggregate in most systems is **narrow money**, sometimes called M1. This consists of notes and coin, but this time only the notes and coin held by non-banks<sup>6</sup> together with non-banks’ holdings of bank **sight deposits**. These are deposits which can be used (to make payment or to exchange for cash) on demand. They are sometimes referred to as **demand** or **checking deposits**. Until recently, it used to be a characteristic of sight deposits that they did not pay interest. The benefits to depositors lay in the fact that banks did not charge for the money transmission services to which these accounts gave access. In some monetary systems, however, a distinction can now be made between sight deposits that do pay interest and those that do not. In such systems, this generates a subset of narrow money known as *non-interest-bearing narrow money*.

In many monetary systems there is also an M2 aggregate. As a rule, this is a broader or more inclusive measure of money than M1, though not so broad

<sup>5</sup> In *International Financial Statistics*, what we have called the monetary base is titled ‘reserves’.

<sup>6</sup> The repeated use of the phrase ‘non-bank private sector’ or ‘non-banks’ as an alternative to ‘the general public’ serves to emphasize an important point, namely, that with the exception of the monetary base, money exists only when it is held outside banks. There is no quantity of monetary assets somewhere in store, waiting to come into circulation. Whatever else money is, it is what people are willing to hold. We return to this when we discuss the demand for money in Chapter 13.

Table 12.2 Money definitions in the USA, end March 2004

Name	Components	Size (\$USbn)
<i>Monetary base</i>	Currency in circulation and with banks + commercial banks' deposits with Federal Reserve banks	694
M1	Currency in circulation + travellers cheques of non-bank issuers + demand deposits at commercial banks (excluding those amounts held by depository institutions, the US government, and foreign banks and official institutions) + other checkable deposits	1,330
M2	M1 + savings deposits (including money market deposit accounts) + small-denomination time deposits + balances in retail money market mutual funds	6,176
M3	M2 + balances in institutional money market mutual funds + large-denomination time deposits (>\$100,000) + repurchase agreement (RP) liabilities of depository institutions, in denominations of \$100,000 or more, on US government and federal agency securities + Eurodollars held by US addressees at foreign branches of US banks worldwide and at all banking offices in the United Kingdom and Canada.	9,033

Source: [www.federalreserve.gov/releases/H3](http://www.federalreserve.gov/releases/H3) (and H6).

as M3. Exactly what is included in aggregates broader than M1 is, as we noted above, very much a reflection of the particular characteristics of a country's monetary system. In the USA the difference between M1 and M2 includes some savings deposits but also Eurodollar deposits held with overseas branches of US banks and even some outstanding repurchase agreements. This reflects the fact first of all that such assets are significant in quantity in the USA and also a belief by the Federal Reserve that in the USA people treat them with a degree of 'moneyness' that means they should be included. The same need not apply in other countries. There is one exception to the definition of M2 as lying on a direct line from M1 to M3. In the UK, M2 is used to refer to an aggregate which tries to measure 'retail deposits'. These are deposits held by households, mainly for transactions purposes. Unlike M1, therefore, they include building society deposits. Since M3 did not contain building society deposits this was a leap beyond M3. But UK M2 also excluded large sight deposits held by firms with banks and in that sense was narrower than M1.

The next definition, used in all systems, is that which captures the components of *broad money*. This incorporates **time deposits**, deposits for which,

strictly speaking, notice of withdrawal is required. Needless to say, time deposits pay interest. Unlike sight deposits, within any system time deposits come with many different terms attached. They vary with respect to the period to maturity, from one week to one year, for example. They vary in the interest rates they pay – typically higher rates for longer maturities – and they vary in their penalties for early withdrawal. Since the late 1960s, some time deposits have provided their owners with a **certificate of deposit**, stating the amount and the terms of the deposit. This 'CD' in turn has been tradable in organized markets, giving the underlying deposit something of the liquidity characteristics of a sight deposit.

So far, we have measured the quantity of money by simply aggregating all its components at their nominal value. While this may be an obvious (and straightforward) approach it suffers from both a theoretical and a practical weakness. At the theoretical level, simple aggregation implies that we are dealing with homogeneous assets. We seem to be saying, for example, that *from a monetary point of view*, £1bn of CDs is the same as £1bn of notes and coin. The mere fact that CDs pay interest while notes and coin do not, however, indicates some degree of differentiation

since otherwise no one would hold notes and coin. At the practical level, economists are usually interested in the closeness of the relationship between a monetary aggregate and income. This is likely to increase with the extent to which the aggregate is dominated by assets used for transactions. However, as we have seen, it is difficult to know exactly where to draw the line between whole classes of assets for this purpose. Notes and coin and sight deposits are all perfectly liquid and are obvious transactions media but we know that time deposits can be switched to sight deposits quickly and cheaply and that other, apparently less liquid, assets have sufficient liquidity that they could still be relevant to transactions, albeit to a lesser degree. The Divisia approach involves weighting each of the component assets according to the extent to which they provide transactions services. If this could be done accurately, then the resulting index should measure the quantity of money available in the economy for transactions purposes and should be more closely linked to expenditure and income.

The weights given to each asset are often said to represent the ‘user cost’ of the asset. To measure the user cost, we must first choose a benchmark asset which provides *no* transactions services. For example, the Bank of England publishes a Divisia index going back to 1977 based upon the components of M4 and using the rate on three-month local authority deposits (the 3mLA rate) as the benchmark. We then subtract the rate of interest on the component asset from the rate on the benchmark asset (the 3mLA rate). Notes and coin are given a weight of one representing the difference between the 3mLA rate and zero. Each other asset,  $a_i$ , is then given a lesser weight,  $w_i$ , equal to the difference between the benchmark rate and its own rate,  $i_i$ , as a fraction of the benchmark notes and coin differential. In symbols:

$$w_i = (3\text{mLA rate} - i_i) / (3\text{mLA rate} - 0)$$

The index,  $D$ , is then the sum of the nominal value of each asset adjusted for its appropriate weight:

$$D = \sum a_i \cdot w_i$$

If it is the transactions services of money in which we are primarily interested, then Divisia clearly possesses several attractions.

Before we leave this discussion of the definition of money, we look briefly at the UK aggregates and their recent history. This will provide further illustration of

the points that we made above, namely, that what is acceptable as money varies with time and between countries with different institutional arrangements. But it also shows something further. In recent years, governments have often thought it important to control the growth of money, in order to confine it within a ‘target’ range. (We look at the techniques of control in Section 12.5 and at the theory behind it in Section 13.4.) Inevitably, such a policy requires the choice of one or more aggregates for control and the choice should be made ideally in the light of theory. For example, if it is thought that the growth rate of money matters because of its role as a medium of exchange, it makes sense to target a monetary aggregate like M1, where the components are mainly used for transactions purposes. Table 12.3 shows how the status of various aggregates has changed over the years in the UK.

One might ask why there have been so many changes, with new aggregates being developed while old ones are discontinued and while others change from being ‘targeted’ to merely ‘monitored’. We can offer three reasons. We have already stressed that which assets fulfil different parts of money’s functions varies over time. M1 in the UK, for example, does not include building society deposits, and might once have been a suitable ‘transactions’ aggregate when building society deposits were used overwhelmingly as a savings medium. But when building societies started to provide money transmission services during the 1980s, M1 seemed no longer appropriate and a new, M2, aggregate was developed (see above). By 1989 it was impossible to avoid the conclusion that building society deposits were indistinguishable from bank deposits and so M3 was replaced as the official definition of money by M4. Secondly, in some regimes aggregates seem to be subject to ‘Goodhart’s Law’ which states that any past relationship between a monetary aggregate and some other variable will break down the moment that the aggregate becomes the subject of attempted control by the authorities. Thirdly, of course, there are occasional shifts in the theory behind monetary policy. If, instead of focusing upon a transactions medium, we begin to think that it is the general level of ‘liquidity’ in the economy that influences people’s spending plans then policy should shift towards targeting a broader aggregate. Ultimately what Table 12.3 shows is just how difficult it is (or at least has been for the UK) to define ‘money’ in an unambiguous and lasting way.

Table 12.3 UK monetary aggregates

Name	Components	First published	Discontinued	Targeted
M0 (wide monetary base)	Notes and coin outside the Bank of England + banks' operational deposits	June 1981		1984– <sup>1</sup>
NIBM1 (non-interest-bearing M1)	Notes and coin in circulation + NBPS <sup>2</sup> holdings of non-interest bearing sight bank deposits	June 1975	May 1991	
M1	NIBM1 + NBPS holdings of interest-bearing sight bank deposits	Dec. 1970	July 1989	1982–4
M2	NIBM1 + NBPS holdings of interest-bearing retail deposits with banks and building societies + NBPS holdings of National Savings ordinary accounts	Sept. 1982 <sup>3</sup>		
M3 (£M3 until May 1987)	M1 + NBPS holdings of bank time deposits + NBPS holdings of CDs with banks	March 1977 <sup>4</sup>	July 1989	1976–86
M3c (M3 until May 1987)	M3 + NBPS holdings of foreign currency bank deposits	Dec. 1970 <sup>4</sup>	July 1989	
M3H	A UK version of euro-M3 (see Table 12.1)	August 1992		
PSL1	M3 – NBPS bank time deposits with original maturity > 2 years + NBPS holdings of bank bills, treasury bills, local authority deposits and certificates of tax deposit	Sept. 1979	May 1987	
PSL2	PSL1 + NBPS building society deposits (excluding term shares) + short-term National Savings instruments	Sept. 1979	May 1987	1982–4
M4	M3 + NBPS building society shares, deposits and CDs – building society holdings of bank deposits, CDs and notes and coin	May 1987		
M4c	M4 + NBNBSPS <sup>5</sup> bank and building society foreign currency deposits	May 1987	May 1991	
M5	M4 + NBNBSPS holdings of bank bills, treasury bills, local authority deposits and certificates of tax deposit + short-term National Savings instruments – building society holdings of bank deposits, CDs and notes and coin	May 1987	May 1991	
'Liquid assets outside M4'	M5 + NBNBSPS holdings of bank and building society foreign currency deposits + further liquid assets of NBNBSPS and overseas sectors (see text)	May 1991		
DCE (Domestic credit expansion)	<i>Change</i> in bank lending to the non-bank private and public sectors	Dec. 1972	March 1986	1967–9
'Divisia'		August 1993		1976–9

Notes: <sup>1</sup> 'Monitored'.

<sup>2</sup> NBPS = non-bank private sector.

<sup>3</sup> Not to be confused with an earlier M2 aggregate (Dec. 1970–Dec. 1971) which was roughly midway between M1 and M3.

<sup>4</sup> £M3 and M3 included public sector £ bank deposits until March 1984.

<sup>5</sup> 'Non-bank, non-bank building society private sector', sometimes known as 'M4 private sector' (M4PS).

**12.3 Banks' balance sheets**

In the last section we noted that bank deposits feature in all measures of 'money'. Indeed, in all of the M1–M3 measures, for example, bank deposits are the dominant component. Thus it follows that changes in the stock of money entail changes in bank deposits and vice versa. Since bank deposits dominate the liability side of banks' balance sheets, and since balance sheets must also balance, it follows that changes in the money supply require changes in banks' assets as well. In order to explain how changes in the money stock occur, therefore, we need to be familiar with the structure of banks' balance sheets.<sup>7</sup> Table 12.4 shows the balance sheet of a commercial bank, simplified to the essentials we require, and employing some symbols with which we need to be familiar.

How can we relate this balance sheet to our discussion in the last section? Firstly, we saw earlier that the monetary base comprised notes and coin in circulation and with banks as well as banks' deposits at the central bank. Clearly, the last two components are assets to banks and they are shown in the top left corner of Table 12.4 as  $C_b$  and  $D_b$  respectively. The first component, notes and coin in circulation with non-banks, we can denote  $C_p$  (standing for 'cash with the public'). Thus we can now write:

$$\text{monetary base} = C_b + D_b + C_p \tag{12.1}$$

**Table 12.4** A commercial bank's balance sheet

Assets		Liabilities	
Notes and coin	$C_b$	Capital and shareholders' funds	$S_r$
Deposits at the central bank	$D_b$	Customer deposits	$D_p$
Loans to the money markets	$L_m$		
Investments	$I_b$		
Loans to the public sector	$BL_g$		
Loans to the general public	$BL_p$		

Recall that we said that banks' holdings of the monetary base,  $C_b + D_b$ , functioned as highly liquid reserve assets. We could thus write:

$$\text{monetary base} = R + C_p \tag{12.2}$$

where  $R$  now stands for bank 'reserves'. Notice that the rest of the asset side is made up of loans to non-banks in some form or another.  $L_m$  represents loans made for very short periods (often overnight or 'at call') to the money markets or other financial institutions;  $I_b$  represents investments in the form of securities, typically short-dated government bonds or treasury bills.  $BL_g$  and  $BL_p$  represent loans to the government (or 'public sector') and to the non-bank private sector, respectively. We saw in Section 10.2 that longer-term loans generally pay a higher rate of interest than shorter ones. Thus, looking at the structure of assets we can draw two conclusions. Firstly, yields are likely to increase as we read down the list ( $C_b$  of course pay no interest, nor in most systems do  $D_b$ ); secondly, banks will wish to maximize their holdings of investments and loans and minimize their holdings of reserves.

Turning to bank liabilities,  $D_p$  – deposits of the non-bank public – form the major component of most definitions of money. As we saw in the last section,  $D_p$  will consist of sight deposits, time deposits and CDs. On the same principle that we just restated, sight deposits will pay little or no interest, while time deposits and CDs will pay interest which increases with the term for which the deposits are made.

Like any other firm, a bank makes profits equal to the difference between revenues and costs. Revenues will consist of interest from the assets listed above together with fees and commissions charged for the services that they offer to customers. Costs will consist of interest paid to depositors, wages and salaries, premises and capital. Focusing on the balance sheet, profits will flow from the difference between the interest received from assets and the interest paid on liabilities. In these circumstances, an obvious question to ask is why do banks hold non-interest-bearing reserves ( $C_b + D_b$ ), when other assets would produce a positive return?

The answer comes in two parts. Firstly, as we saw in Section 1.3.2, banks engage in 'maturity transformation'. This means that their liabilities are of shorter

<sup>7</sup> For the UK, we shall assume that building societies are included within the general category of 'banks'. This is not quite accurate since building societies hold their own reserves with banks rather than with the Bank of England. It makes little difference to our analysis, however. A detailed explanation of the relationship between building societies, banks and the Bank of England is contained in Howells (1993).

**Box 12.1 Sources of net withdrawals from banks**

We need to distinguish between withdrawals from individual banks and withdrawals from the banking system as a whole.

**Withdrawals from individual banks**

- Customers of bank A make net payments to customers of other banks.
- Customers of bank A make net drawings of notes and coin from bank A.
- Customers of bank A make net payments to the public sector.

**Withdrawals from the system as a whole**

- Bank customers make net drawings of notes and coin from banks.
- Bank customers make net payments to the public sector.

maturity than their assets and can thus be withdrawn more readily than banks can realize their assets.<sup>8</sup> Secondly, banks are central to the payments mechanism which means that withdrawals (and receipts) of deposits are continuous. On some occasions, withdrawals and receipts will cancel and *net* withdrawals will be zero. However, as a general rule they will not and some days will see net receipts and others will see net withdrawals. Box 12.1 summarizes the ways in which net withdrawals may take place.

The public's confidence requires that deposits be convertible into cash on demand and thus banks have to maintain sufficient cash, or central bank balances which they can exchange for cash. Because of their role in ensuring convertibility, the level of bank reserves is usually expressed as a ratio to their deposits. This is known as the **reserve ratio**. In some monetary systems, this ratio is set down by regulation (a **mandatory ratio**) and in others it is left to banks' own judgement (a **prudential ratio**) though there is usually an obligation on banks to inform the central bank of any intended change. In some systems, the ratio differs for different types of deposit, naturally being highest for sight deposits and decreasing against deposits with increasing terms to maturity.

So far we have considered a static position. We have a given quantity of money, the largest part of which comprises bank deposits, while the rest is made up of the notes and coin from the monetary base which are not held as banks' reserves. Letting  $M_s$  stand for some unspecified definition of money, therefore, we have:

$$M_s = D_p + C_p \quad (12.3)$$

We want now to turn our attention to *changes* in the money supply and how banks' balance sheets are involved in such changes. The essential point to remember in working through the following illustrations is that balance sheets always balance and therefore any change that we make on one side must be matched by an equal change (with the same sign) on the opposite side or by an equal change (with opposite sign) on the same side.

In Table 12.5, we illustrate the process of loan (and deposit) creation using two banks, though to economize on space we have reduced the list of both banks' assets from what we saw in Table 12.4. In particular, we want to demonstrate three general principles. The first concerns the relationship between loans and deposits. In Table 12.5, bank A agrees to make additional credit facilities available to a customer. But stop to consider that there is a difference between a bank agreeing to a customer's demand for extra credit facilities and the extra loan *coming into existence*. The latter can only happen when the borrower writes a cheque on which the bank has to make payment. The loan comes into existence when the bank makes the payment. The importance of this distinction is that it shows that a loan cannot come into existence until someone is paid. That means that for *every loan created, someone must receive an addition to his or her deposit*. Loans and deposits must increase together. The loan comes into existence when the client draws a cheque. In bank A then,  $BL_p$  is shown with a (+) and we must look for some corresponding and simultaneous increase in  $D_p$ . In a multi-bank system, it is quite likely that a customer will make payment to someone who banks elsewhere. In our example, the borrower from bank A makes payments to a client of bank B. Thus in bank B we show  $D_p$  with a (+). Notice that we are now violating our fundamental rule that balance sheets must balance. Assets appear to exceed liabilities for bank A, while the position is reversed for bank B.

<sup>8</sup> Indeed, this 'playing the yield curve' is precisely why they earn more on assets than they pay on liabilities.

**Table 12.5** Loans increase in a multi-bank system (I)

Bank A			
Assets		Liabilities	
Notes and coin	$C_b$	Capital and shareholders' funds	$S_f$
Deposits at the central bank	$D_b$ (-)	Customer deposits	$D_p$
Loans to the public sector	$BL_g$		
Loans to the general public	$BL_p$ (+)		

Bank B			
Assets		Liabilities	
Notes and coin	$C_b$	Capital and shareholders' funds	$S_f$
Deposits at the central bank	$D_b$ (+)	Customer deposits	$D_p$ (+)
Loans to the public sector	$BL_g$		
Loans to the general public	$BL_p$		

Clearly this cannot be correct. To complete the picture, we have to focus upon 'reserves'. We said earlier in this section that banks need to hold a safe minimum level of reserves in order to meet customer withdrawals. Sometimes they will be withdrawals of cash; sometimes, as here, they will be transfers of deposits to other banks; sometimes, if the government banks with the central bank, they will be transfers to the government's accounts at the central bank. In our illustration, the payment by the customer of bank A to the customer of bank B is matched by a transfer of bank A's deposits at the central bank to bank B's account at the central bank. Thus for bank A,  $D_b$  acquires a (-) while  $D_b$  for bank B acquires a (+). This adjustment restores the balance.

The second principle is that of portfolio equilibrium (which we first met in Chapter 8). Consider what has happened to the *composition* of these balance sheets since the creation of the loan. Loans and deposits have

increased, relative to all other assets and liabilities. Bank A has a balance sheet unchanged in size but it now has replaced low (or zero) earning assets with higher earning customer loans. Notice also that its reserve ratio has therefore fallen and further adjustments will very likely be necessary. Bank B has a *larger* balance sheet now. It also has a *higher* reserve ratio than it previously had. This is because its reserves have increased by the same absolute amount as its deposits; that is, they have increased in the ratio 1:1 while the initial ratio was less than 1:1. If we assume that the initial balance sheet position was one of equilibrium – that is to say that the bank was happy with the distribution of its assets and liabilities having regard to their relative risks and returns – it is unlikely that this new position is also one of equilibrium. We should expect to see that there will be some further readjustment.

The third principle involves the reserve ratio. In our illustration, loans and deposits have increased equally, *all other assets and liabilities unchanged*. One aspect of the balance sheet composition that must have changed, therefore, is the ratio of reserves to deposits.  $D_b + C_b$  are now smaller relative to  $D_p$  (and of course to  $L_p$ ) in bank A than they were before. If we follow Equation 12.2 above and call banks' holdings of cash and central bank deposits 'reserves', we can write the reserve ratio as  $R/D_p$ . It is this that has diminished (because  $D_b$  has diminished while  $D_p$  is unchanged). Whatever a bank may think about the composition of the rest of its balance sheet, this is one relationship about which it can hardly be indifferent. Clearly, if there is a mandatory ratio, the bank is under an obligation to see that this ratio is maintained. Even if the ratio is prudential, a bank has a target ratio based on its own experience of what is a safe level of

**More from the web**  
**The Bank of England's balance sheet**

Details of the Bank of England's assets and liabilities (divided between the Issue Department and the Banking Department) are published monthly on the Bank's website. They appear in Table B1.1 of *Bankstats*.

Components of commercial banks' balance sheets at the end of January 2004 appear in Table 3.1. They can be updated from *Bankstats*, Table B1.2.

The Bank of England's website is at [www.bankofengland.co.uk](http://www.bankofengland.co.uk)



**Table 12.6** Loans increase in a multi-bank system (II)

Bank A			
Assets		Liabilities	
Notes and coin	$C_b$	Capital and shareholders' funds	$S_f$
Deposits at the central bank	$D_b$ (-)[+]	Customer deposits	$D_p$ [+]
Loans to the public sector	$BL_g$		
Loans to the general public	$BL_p$ (+)		

Bank B			
Assets		Liabilities	
Notes and coin	$C_b$	Capital and shareholders' funds	$S_f$
Deposits at the central bank	$D_b$ (-)[+]	Customer deposits	$D_p$ (+)
Loans to the public sector	$BL_g$		
Loans to the general public	$BL_p$ [+]		

reserves, given the deposits and withdrawals that its customers make. If this new loan threatens to take the ratio below its desired level, the bank has to think about how to obtain additional reserves. For bank B's reserve ratio to be restored to its original value, by contrast, bank B would have to *increase* its deposits by some multiple of the extra reserves it received.

In the example above, notice that the extra lending was carried out entirely by one bank while the extra deposits appear entirely in a different bank. In practice, in a multi-bank system, we should expect all banks to be making similar decisions. If economic conditions lead customers to ask for more credit, this is not likely to affect one bank any more than another. Thus what we have shown in Table 12.5 is a very incomplete story. In Table 12.6 we show a more realistic picture. Beginning with the position as we left it in Table 12.5, bank B now also makes additional loans to its customers (these later adjustments are

shown in square brackets). Thus in bank B,  $BL_p$  [+]. These will be paid to customers of bank A ( $D_p$  [+]), with corresponding transfers of central bank deposits from bank B ( $D_b$  [-]) to bank A ( $D_b$  [+]). Notice carefully the final position. Both banks have made loans and both banks have clients holding more deposits. In the course of the process, there have been transfers of central bank deposits ('reserves') between the two banks which cancel. Once again our fundamental principles hold. Balance sheets balance; an increase in lending means an increase in money; a change in lending (and deposits), *ceteris paribus*, means a change in the reserve ratio and in the ratio of capital and shareholders' funds to assets and liabilities. Exercise 12.1 provides an opportunity to work through a three-bank example of the relationships we have just described.

Before leaving this examination of bank balance sheets and their importance in money supply changes, we need to go one further step and integrate the central bank's balance sheet. This is shown in Table 12.7. Central bank assets, like those of commercial banks, are loans in some form or other.  $CBL_g$  indicates central bank loans to government while  $B_g$  stands for central bank holding of government bonds. Other assets include building and equipment,  $F$ . Liabilities, again like those of commercial banks, are overwhelmingly customers' deposits but customers are the commercial banking system,  $D_b$ , and government,  $D_g$ . Notes and coin in circulation are also liabilities of the central bank. (We have ignored capital and shareholders' funds.) None of the changes that we have examined so far has had any impact on the aggregate figures in the central bank's balance sheet. In our multi-bank example there were transfers of banks' deposits,  $D_b$ , between two banks. This means that the central bank moves such deposits

**Table 12.7** The central bank's balance sheet

Assets		Liabilities	
Loans to commercial banks	$CBL_b$	Deposits of commercial banks	$D_b$
Loans to government	$CBL_g$	Deposits of government	$D_g$
Securities (government bonds)	$B_g$	Capital and reserves	$CR$
Fixed and other assets	$F$		

from one bank to another in its own accounts, but this has no effect upon the total. There are, however, some transactions which will affect the aggregates in the central bank's balance sheets.

The most common are those transactions involving the public's exchange of bank deposits for cash and vice versa; and those that involve flows between the public and private sectors. Let us take the case where the public increases its holdings of notes and coin ( $C_p$ ) surrendering deposits ( $D_p$ ) as it does seasonally, at Christmas, for example. In commercial banks' balance sheets we have  $D_p(-)$  matched initially by  $C_b(-)$ . It is unlikely that banks will wish to be short of cash for very long, however, and they will quickly draw more notes and coin from the central bank. This second step sees  $C_b$  restored, while the reduction in bank assets is transferred to  $D_b(-)$ . These transactions have their counterpart in the central bank's balance sheet where banks' exchange of central bank deposits

for cash is shown by  $D_b(-)$  at the central bank. But so far as the central bank's balance sheet is concerned, this is offset by  $C_p(+)$  and the balance sheet still balances, and is unchanged in size.

Suppose now that the general public makes net payments to the government. (The government is running a budget surplus.) At commercial banks, we have the sequence  $D_p(-)$  and  $D_b(-)$ . At the central bank we have  $D_b(-)$  matched by  $D_g(+)$ , as government deposits increase. The money supply has decreased (by the reduction in  $D_p$ ) and banks have become less liquid:  $R/D_p$  has fallen. At the central bank, there may be further adjustments if the  $D_g(+)$  is reduced in order to pay off some of the borrowing from the central bank,  $CBL_g$ .

Suppose by way of contrast that the government runs a budget deficit. It may borrow from the central bank. In this case, as the government spends the loan:  $CBL_g(+)$ ,  $D_p(+)$  (as the general public receives the payments from government). These new customer deposits are matched

**Exercise 12.1 Loans create deposits**

Imagine a system with just three commercial banks, A, B and C, whose balance sheets are shown below.

Bank A		Bank B		Bank C	
$A$	$L$	$A$	$L$	$A$	$L$
$C_b = 10$	$D_p = 1000$	$C_b = 10$	$D_p = 1000$	$C_b = 10$	$D_p = 1000$
$D_b = 40$		$D_b = 40$		$D_b = 40$	
$BL_p = 950$		$BL_p = 950$		$BL_p = 950$	

where  $D_p$  are customers' deposits,  $C_b$  is cash (notes and coin) held by banks,  $D_b$  are banks' deposits at the central bank and  $BL_p$  are loans to the non-bank public. Bank reserves,  $R$ , consist of  $C_b + D_b$  and a bank's reserve ratio is thus  $R/D_p$ . Assume that non-banks hold 500 in notes and coin ( $C_p$ ).

- 1 What is the size of the money stock,  $C_p + D_p$ ?
- 2 Calculate the reserve ratio,  $R/D_p$ , for each bank and for the system as a whole.

Suppose now that bank A increases its loans ( $BL_p$ ) by 10 and that its customers use this lending to pay 5 to clients of bank B and 5 to clients of bank C.

- 3 Show the new balance sheet position for each bank.
- 4 By how much has the money supply increased?
- 5 Calculate the new reserve ratio for each individual bank and the aggregate reserve ratio.

Suppose now that bank B also increases its lending by 10 and that its customers use this lending to

pay 5 to clients of banks A and C, and that bank C increases its lending by 10 and that its customers use this lending to pay 5 to clients of banks A and B.

- 6 What is the size of the money stock now?
- 7 What is the reserve ratio for each bank?
- 8 What is the aggregate reserve ratio?
- 9 What quantity of bank deposits are customers of each bank now holding?

Suppose that customers of each bank now decide to increase their holdings of notes and coin ( $C_p$ ) by 5.

- 10 What effect does this have on the total money supply?
- 11 What effect does this have on the composition of the money supply?
- 12 What effect does this have on the aggregate reserve ratio?

**Exercise 12.2 The base-multiplier process**

Imagine the same system that we saw in Exercise 12.1, with the same banks and the same balance sheets.

Bank A		Bank B		Bank C	
A	L	A	L	A	L
$C_b = 10$	$D_p = 1000$	$C_b = 10$	$D_p = 1000$	$C_b = 10$	$D_p = 1000$
$D_b = 40$		$D_b = 40$		$D_b = 40$	
$BL_p = 950$		$BL_p = 950$		$BL_p = 950$	

In this exercise, non-banks hold a total of 300 in notes and coin ( $C_p$ ).

- |                                                                                                                                                               |                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1 Calculate the size of the banks' reserve ratio.</li> <li>2 Calculate the size of the public's cash ratio.</li> </ol> | <ol style="list-style-type: none"> <li>3 Using Equation 12.6, calculate the size of the multiplier.</li> <li>4 Recalculate the size of the multiplier if the banks' reserve ratio rises to 0.07.</li> <li>5 Calculate the value of the multiplier if the public's cash ratio now falls to 0.08.</li> </ol> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

in commercial bank balance sheets by  $D_b(+)$  and this same  $D_b(+)$  appears in the central bank's balance sheet as the counterpart to the initial  $CBL_g(+)$ . Bear in mind also that  $D_b(+)=D_p(+)$  and thus banks' reserve ratio,  $R/D_p$ , increases and banks are more liquid.

The flows of funds that we have just seen may be described as 'spontaneous'. They have arisen from the imbalance between government expenditure and tax revenue. But it is always open to governments and central banks to buy or sell government debt, regardless of their financing needs. Such sales/purchases will cause induced flows. By buying government bonds from the non-bank public, the central bank initiates the sequence  $B_g(+)$ ,  $D_p(+)$  as the public receives payment, and this is matched in commercial bank balance sheets and at the central bank by  $D_b(+)$ . The money supply is increased and banks are more liquid. Conversely, a sale of government debt to the non-bank public results in the sequence  $B_g(-)$ ,  $D_p(-)$  and  $D_b(-)$ . The money supply is reduced and the banks are less liquid.

In the next section we shall see that there are further flows which cause changes in loans, deposits and the money supply. We list them all in Box 12.3.

saw that changes in the quantity of money must involve changes in banks' balance sheets. Furthermore, since balance sheets must always balance, a change initiated at one point must be matched or compensated for by a change at some other point. Our accounting conventions tell us, for example, that *if* banks make new loans, there will be new deposits while *if* people exchange their deposits for government debt, customer deposits diminish along with banks' deposits at the central bank. But simply observing these interactions can tell us nothing about causality. We know what is involved when the money supply changes but we do not know what, *as a rule*, initiates those changes. When it comes to explaining why changes in the money supply occur, we need something further.

One myth which we are not going to perpetuate is that the *cause* of changes in the quantity of money occurs if and only if the central bank changes the size of the monetary base. This is an account of money supply determination which has proved historically popular and has been kept alive by the popularity of the IS/LM model of a simple macroeconomy. In that model, the LM curve is derived on the assumption of a fixed quantity of money which is exactly what is provided by the 'monetary base' or 'deposit-multiplier' account of money supply determination.

The account begins by putting together as a ratio of the stock of broad money ( $M$ ) and the monetary base ( $B$ ) and observing that  $M/B$  has a value much greater than unity. It is then shown that this ratio is

**12.4 Models of money supply determination**

We have seen that most measures of money are dominated by bank deposits. In the last section we

identical to the ratio that we get if we re-write it in terms of the components of  $M$  and  $B$ . Thus:

$$\frac{M}{B} \equiv \frac{C_p + D_p}{C_p + C_b + D_b} \quad (12.4)$$

where the terms on the right-hand side have the same meaning as they had in the tables of the previous section of this chapter.  $C_p$  is cash (notes and coin) held by the non-bank public;  $C_b$  is cash held by banks;  $D_b$  are deposits held by commercial banks at the central bank while  $D_p$  are the non-bank public's holdings of bank deposits – the bulk of the broad money supply. But we know, from Equation 12.2, that  $C_b + D_b$ , a subset of the monetary base, constitute banks' reserves. Hence we can re-write Equation 12.4 as:

$$\frac{M}{B} \equiv \frac{C_p + D_p}{C_p + R} \quad (12.5)$$

If we now divide each item on the right hand side by  $D_p$  we make the discovery that the ratio  $M/B$  is identical to the relationship between two further ratios.

$$\frac{M}{B} \equiv \frac{C_p/D_p + D_p/D_p}{C_p/D_p + R/D_p} \quad (12.6)$$

$C_p/D_p$  is the public's cash ratio while  $R/D_p$  is the banks' reserve ratio. If we denote these by  $\alpha$  and  $\beta$  respectively, then 12.6 can be written more conveniently as

$$\frac{M}{B} \equiv \frac{\alpha + 1}{\alpha + \beta} \quad (12.7)$$

and we can then show, by multiplying both sides by  $B$ , that the expression on the right hand side must be a multiplier which accounts for the fact that the quantity of broad money is much larger than the base:

$$M \equiv B \cdot \frac{\alpha + 1}{\alpha + \beta} \quad (12.8)$$

As it stands, Equation 12.8 is simply an identity. However, just a few assumptions give it considerable behavioural content. Recall that the components of the monetary base are all liabilities of (are issued by) the central bank. Then if we assume:

- the central bank is willing and able to control its liabilities
- the public's cash ratio is stable
- the banks' reserve ratios are stable

it follows that the central bank's control of the base will 'produce' a predictable quantity of money.

Note also the implication: if the central bank does nothing to change the base, the money stock is *fixed*. Unfortunately, these assumptions are very easy to make with the result that the **base-multiplier account** of money supply determination is still deeply embedded in macroeconomics, ten years after Goodhart described it as being so far removed from reality that its appearance in textbooks 'amount[s] to misinstruction' (Goodhart, 1984, p. 188).

What exactly is so misleading about the approach? Firstly, as we saw at some length in Section 9.4, the monetary policy instrument that has been adopted by all central banks for many years now is a short-term rate of interest, not the quantity of base money. We described the role of the central bank as being that of a monopoly supplier of reserves in a system-wide shortage of liquidity faced with the standard choice open to any monopolist: it can set the price or the quantity. The base-multiplier account requires it to set the quantity but in the real world we know it sets the price. A further fundamental consequence follows from this. If the central bank sets the rate of interest it must then supply the reserves that banks require and this will depend upon the demand for new loans and deposits *at the going rate of interest*. 'In the United Kingdom, money is endogenous – the Bank supplies base money on demand at its prevailing interest rate, and broad money is created by the banking system' (King, 1994, p. 264). Far from the money supply being a magnitude exogenously determined by the central bank, it is determined, in effect, by the state of the economy.

This then brings us face to face with two further aspects of reality with which the base-multiplier approach cannot deal. We have seen that it presupposes that if the central bank does nothing, the *stock* of money will not change. But because the central bank sets the interest rate, supplies reserves as required and the quantity of money depends upon how much the economic system requires, the money supply is in a state of continuous expansion. If the central bank does nothing, the money supply *expands* at whatever rate agents require. From this it follows that central banks have no policy interest whatsoever in the *stock* of money. Their concern with the quantity of money and credit (if they are concerned at all) is with its *rate of growth*. The ECB is one central bank that says explicitly that it takes account of the behaviour of the money supply, but as Box 12.2 makes clear, the ECB's 'reference rate' for money is a *growth* rate.

**Box 12.2 The role of money in ECB policy decisions**

The prominent role for money in the ECB's strategy is signalled by the announcement of a reference value for the growth of the broad money aggregate, M3. The choice of M3 is based on the evidence . . . that this aggregate possesses all the desired properties: in particular it has a stable money demand relationship and leading indicator properties for future price developments in the euro area. The reference value for the growth of M3 has been derived so as to be consistent with the achievement of price stability . . . the reference value was set at 4½% by the Governing Council in December 1998.

Source: ECB, *The Monetary Policy of the ECB 2004*, Box 3.7.

This is not to say that it is impossible to imagine a monetary system and policy regime in which the focus might be on stocks and where the magnitude of those stocks was determined by the deliberate action of the central bank to control the base. In these circumstances, the base-multiplier approach might yield useful insights. But this is not the world we live in, and a glance at Box 12.4 reveals a list of compelling reasons against modifying the current system in that direction.

When we are dealing with monetary regimes where the central bank sets interest rates and supplies reserves on demand, where the resulting flow of new deposits depends upon agents' demand for loans and where policy is concerned with the resulting rate of growth of money, we are likely to get better insights from the 'flow of funds model' which focuses explicitly upon the flow of 'new' money and seeks to explain this by looking at the demand for loans. In this model the demand for new lending is assumed as a rule to be positive because the demand for loans, at any given rate of interest, is determined by the level of economic activity and the level of prices. Since both of these tend to increase over time, there is a tendency for firms and households to increase their borrowing from banks over time. The demand for loans is *endogenous* – it is determined by other variables within the economic system. Control of the money supply in this model requires that the authorities control the demand for loans.

Section 12.5 below shows that there are potentially many ways in which this could be done including 'direct' controls upon bank lending. Such controls were

commonplace in the UK until 1971 (and can still be found in the monetary systems of some less developed countries) but all have disadvantages as the details show. The general problem is that direct controls were usually imposed with the intention of restricting the supply of bank lending below the level that would have cleared the market at the prevailing level of interest rates. This creates an excess demand and requires some form of non-price rationing of the available bank credit. Non-price rationing generally results in some combination of inefficiency, inequity and evasion. It is for this reason that we have a widespread consensus that the central bank should set the price of reserves in order to influence the price that banks charge for credit.

Our definitions and symbols are the same as those we have used throughout this chapter. The first step is to remember (from Section 12.3) that banks' deposit liabilities are matched by loans of some form. Then it follows that *changes* in one must be matched by changes in the other. Thus:

$$\Delta D_p \equiv \Delta BL_p + \Delta BL_g \quad (12.9)$$

but since the money stock consists also of notes and coin, we may write changes in the money stock as:

$$\Delta M_s \equiv \Delta C_p + \Delta BL_p + \Delta BL_g \quad (12.10)$$

Consider now the origin of  $\Delta BL_g$ . The starting point is the total of government or public sector borrowing, the *PSNCR* ('public sector net cash requirement'). This can be financed by selling government debt to the non-bank private sector,  $\Delta G_p$ . It can also be financed by selling foreign exchange for the domestic currency which provides an 'external' source of finance,  $\Delta ext$ , or, as a last resort, it can be financed residually, by borrowing from the banking system,  $\Delta BL_g$ . Since the take-up of newly issued notes and coin,  $\Delta C_p$ , also provides finance to the government, though in most countries incidentally rather than deliberately, we can write the government financing identity as:

$$PSNCR \equiv \Delta G_p + \Delta C_p + \Delta ext + \Delta BL_g \quad (12.11)$$

(Notice that the *PSNCR* appears without the  $\Delta$  sign. It is already a *flow*, whose *stock* counterpart is (roughly speaking) the National Debt.)

We can now combine Equations 12.10 and 12.11 to show that changes in  $M_s$  depend upon the size of the *PSNCR* and its *non-bank* methods of finance, since they together determine  $\Delta BL_g$ .

$$\Delta M_s \equiv \Delta C_p + \Delta BL_p + PSNCR - \Delta G_p - \Delta C_p - \Delta ext \quad (12.12)$$

The two references to  $\Delta C_p$  obviously cancel and the outflow of foreign currency in exchange for sterling reduces the money supply. Thus making these adjustments to Equation 12.12, we have what is commonly described as the key flow-of-funds identity. In Equation 12.13 we have also reordered the terms to match the most common presentation.

$$\Delta M_s \equiv PSNCR - \Delta G_p - \Delta ext + \Delta BL_p \quad (12.13)$$

Unlike the base-multiplier model, the flow of funds approach focuses attention upon the demand for credit, by both the public and the private sectors. Given the many different ways in which both the public and private sectors can borrow, it follows that there are quite a number of loan-related flows which could have some impact upon the money supply. We saw some earlier in Section 12.3. Box 12.3 provides a complete list.

We saw earlier that the base-multiplier approach to the money supply process *implied* certain ways in which the authorities should act in order to control the money supply. So too does the flow of funds model, though naturally it directs our attention to the importance of controlling the demand for bank loans. This brings us quite quickly to a major role for interest rates in influencing the growth of money. This is clearly seen if we take each of the variables in turn.

The PSNCR is the balance of government revenue from tax (and charges) and expenditure. It is thus the outcome of fiscal policy instrument settings and the

level of economic activity. As such, and in economies where a large part of government spending is cyclically determined and non-discretionary, it is not an obvious candidate for use as an instrument for monetary control. Governments, and their electors, have preferences about public services and about taxation which have their own implications for the PSNCR.

Look now at the second component of Equation 12.13, which tells us that, *ceteris paribus*, the larger the quantity of government debt sales,  $G_p$ , to the NBPS, the lower the rate of monetary expansion. Furthermore, *ceteris paribus*, one would expect that larger debt sales would require higher interest rates. An active policy of using debt sales for monetary control purposes requires governments to accept whatever level of interest rates may be necessary to sell the debt. Ideally, this would require government debt to be sold entirely by auction. This is a position towards which the UK has moved slowly over the past 15 years, but most governments have preferred to maintain some control over medium- and long-term interest rates by selling debt only when they think that markets will accept it at current yields and prices.

In Equation 12.13 monetary growth will decrease with increases in the sale of domestic currency by residents in exchange for foreign currency. The limitations to the use of foreign exchange transactions as a monetary policy instrument are obvious. Net purchases by the authorities of domestic currency, aimed at reducing monetary growth, will force the exchange rate up, under a floating exchange rate regime, causing a fall in import prices. This, and the rise in export prices, will weaken the balance of payments which slower monetary growth is often meant to strengthen. Under a fixed exchange rate regime, the device is simply not available.

Clearly, the use of PSNCR, debt sales and foreign exchange transactions for monetary control are subject to formidable constraints. This means that monetary control within this model is forced to focus upon the regulation of lending to the non-bank private sector. This emphasis is further strengthened by the private sector's domination of bank lending flows in most monetary systems. It is not uncommon now for public sector borrowing to be 'fully-funded'. That is to say, financed without recourse to the banking system. In fact, in 2003 in the UK, additional bank lending to the non-bank private sector ( $\Delta BL_p$ ) was approximately £81bn. But the total amount of net new bank lending (resulting in new deposits) was only £68bn because

### Box 12.3 Flows that change the stock of money

- Central bank loans to government ( $\Delta CBL_g$ )
- Central bank sales or purchases of government debt ( $\Delta B_g$ ) from:
  - the government
  - banks
  - non-bank private sector
- Changes in central bank holdings of foreign currency as a result of transactions with government or foreign exchange market intervention
- Bank loans to the non-bank private sector ( $\Delta BL_p$ )
- Bank loans to the public sector ( $\Delta BL_g$ ) Bank purchases/sales of government debt ( $\Delta B_g$ ) from the non-bank private sector
- Bank purchases of government debt ( $\Delta B_g$ ) directly from government to finance a government deficit.

net new bank lending to the government ( $\Delta BL_g$ ) was actually *negative* (c.  $-\pounds 13$ bn). The government managed to sell more debt than it needed to fund the PSNCR. Given the small role played by the PSNCR and the even smaller role played by the residual financing of it, one might wonder why we arrange the terms so that the flow of funds explanation of monetary growth begins with the PSNCR (as in Equation 12.13). The answer is largely historical. This framework for looking at changes in the money supply developed in the late 1960s when government borrowing was much larger (it reached 10 per cent of GDP in 1976) and its financing was a major problem. If the framework were developed today, no doubt it would be arranged so as to give priority to the private sector's demand for credit. The next section reviews briefly a number of possible ways in which the authorities can influence monetary growth.

## 12.5 Controlling the money supply

In Section 12.3, we established that changes in the money supply are bound to involve changes in the stock of bank deposits and that the balance sheet identity means that changes in bank deposits must be matched or compensated for by changes elsewhere in the balance sheet. Remember also the principle of portfolio equilibrium. A change in any component of the balance sheet is likely to have further repercussions as banks adjust their portfolios in the light of prevailing risks and returns. In theory, therefore, an intervention at any point in the balance sheet could have some effect upon the money supply. However, the first and fundamental choice that the authorities face is whether to act by 'direct' or quantity controls, or by price. All these possibilities add up to a formidable choice. We summarize them below.

### (1) Price effects on bank deposits

A rise in official interest rates (see Section 9.3.3) causes all short-term rates to rise in sympathy. However, if deposit rates can be held down, the return on non-money assets rises *relative* to money and agents will be less willing to hold money. Since money can only exist if it is held by non-banks, this increase in the cost of holding money reduces the money supply (or its rate of growth if we think in terms of flows). The most famous example of this technique was 'Regulation Q'

in the USA which limited interest that could be paid on deposits. In the UK, and in other countries, the interest paid on *sight* deposits was limited until the past few years by the commercial decision of banks. So long as deposit rates are restricted or at least 'sticky', the authorities can exert some control over the money stock by varying interest rates.

### (2) Quantity effects on bank deposits

Regulations on the rate of growth of deposits were a feature of the 'supplementary special deposit scheme' or 'corset' during the 1970s. It was effective in the short term but banks and their clients eventually devised techniques such as the 'bill-leak' which allowed borrowers to borrow (but from non-banks) and enabled banks to charge commissions (to replace their interest charges). The result of this 'disintermediation' was that borrowing and spending carried on pretty much as though the regulations were not there, although the money supply (and bank lending) statistics gave the impression of control. This episode illustrates the weakness of all direct controls, namely that they encourage innovative behaviour which undermines the regulations.

### (3) Price effects on bankers' deposits at the central bank

This could mean varying the interest rate paid on banks' deposits at the central bank. A rise in rates ( $r_r$ ) would encourage banks to hold more reserves,  $\beta$  would increase and the multiplier and money supply would fall. Not used.

Alternatively, it could refer to changes in the rediscount or lender of last resort rate ( $r_d$ ). An increase raises the cost to banks of being short of reserves and having to borrow from the central bank. This would encourage banks to be more cautious, increasing  $\beta$  and reducing the multiplier and the money supply. Changes in  $r_d$  are a major technique of monetary control but more likely through the mechanism described in (7) below.

### (4) Quantity effects on bankers' deposits

Changing the quantity of reserves available to banks is often presented as the major method of monetary control. As we saw at the end of Section 12.3, the authorities can buy (sell) government bonds which increases (decreases)  $D_p$  as well as  $D_b$ . The change in the latter causes a change in the ratio of reserves to

deposits ( $R/D_p$ ) and restoring this ratio to its original value requires multiple changes in  $D_p$ . The authorities' use of 'open market operations', as described here, is often presented in textbooks as *the* obvious technique of monetary control. It has many disadvantages, however, which mean that it is very rarely used in practice. These disadvantages are set out in Box 12.4.

### (5) Price effects on banks' holdings of government securities

Imagine that the authorities increase the rate of interest offered on government bonds and that banks increase their holdings. For commercial banks,  $I_b$  rises while  $D_b$  falls. At the central bank of course  $D_b(-)$ , while

#### Box 12.4 Monetary base control rejected

Virtually every monetary economist believes that the CB [central bank] can control the monetary base . . . Almost all those who have worked in a CB believe that this view is totally mistaken.

(Goodhart, 1994, p. 1424)

The base-multiplier model of money supply determination is presented in almost every macroeconomics textbook as the only explanation of money supply determination. Furthermore, it is *implied* in all those texts which, lacking a formal model, still present the money supply as a curve drawn vertically in interest-money space. And yet, as Goodhart says, no central bank uses open market operations with a view to changing the size of the base in order to achieve a multiple change in deposits. Even in 1981, at the 'high tide of monetarism' when monetary targets were universally adopted, the Bank of England considered explicitly moving to a system of MBC and just as explicitly rejected it. Why the model continues to dominate in textbooks when the real world consistently rejects it is an issue we do not have time to discuss, but we can offer a number of reasons for the rejection.

- Firstly, MBC is a quantity control. In a pure system of MBC, supply would be fixed (some positive interest-elasticity notwithstanding) and fluctuations in demand would have to be absorbed entirely by price. If the authorities were trying to target the base over very short periods, the fluctuations in short-term interest rates could be extreme. The authorities are always reluctant to create situations in which interest rates may be very volatile. Targeting the base, averaged over a longer period, would ease this problem by allowing some day-to-day flexibility in quantities but so long as quantities are targeted rather than price, price must fluctuate.
- Secondly, while the base consists of liabilities of the central bank and one might expect the central bank to be fully in control of its own liabilities, this is not always the case. Firstly, the central bank has to know in advance what will happen to its liabilities in the

course of ordinary transactions.  $CBL_b$  will fluctuate as a result of the Bank's lender of last resort role and  $CBL_g$  and  $B_g$  will fluctuate if the central bank has to provide residual finance to governments when debt sales to the non-bank public fail to match the PSNCR. Most central banks make daily predictions about these flows and inform banks and money markets of their plans. It is quite common for the financial press to report the predictions and outcomes. The errors are very large.

- Thirdly, even if the central bank knew what effect its ordinary transactions were going to have on the base this does not mean that it could take the appropriate measures. Knowledge that the base was going to expand more rapidly than desired does not mean that the Bank can suddenly organize a bond issue in order to offset it. Again, this problem becomes more acute the shorter the targeting period. But even if the aim were to achieve an average rate of growth on a quarterly basis, frequent sales of government debt could be very disruptive to financial markets. To ensure the sale of the correct *quantity* governments would have to adopt a pure auction form of sale and thus would have to accept the market clearing price. Once again we are back to volatile interest rates, this time at the longer end of the spectrum.
- Fourthly, in some systems there would need to be major structural changes. For example, it is doubtful whether MBC is compatible with an overdraft system of borrowing where banks agree maximum credit limits with their clients who then use whatever fraction of the limit they need. In the aggregate, this is often of the order of 50–60 per cent. A tightening of monetary policy would inevitably mean that firms would want to use more of their overdrafts; and banks (unable to get reserves) would then face the choice of either allowing the loans and breaching the reserve ratio requirement or defaulting on their promises to borrowers. MBC would also require governments to bank with the commercial banking system rather than the central bank so that payments



**Box 12.4 continued**

between the public and private sectors would not cause continuous and large fluctuations in  $D_b$ .

- Fifthly, there is an asymmetry in the operation of MBC caused by the fact that most bank assets are non-marketable. This means that an open market purchase of debt will increase  $D_p$ ,  $D_b$  and  $\beta$  as predicted and banks, being more liquid, can try to increase their lending. But a sale, causing a reduction in  $D_p$ ,  $D_g$  and  $\beta$ , requires banks to reduce loans. But loans are not, as a rule, marketable. They can only be reduced by insisting on repayment (or refusing to renew). This is likely to prove very disruptive to trade, resulting in bankruptcies.
- Sixthly, if reserves pay no interest then reserve requirements act as a tax on bank intermediation since they increase its cost. This occurs because the remaining, earning, assets have to earn a higher

return to compensate for the zero return on reserves. This increases the spread between deposit and lending rates, which many would regard as the appropriate way of calculating the cost of intermediation. As with any tax, the supply curve is shifted to the left. Less intermediation is 'bought' and 'sold' at a higher price.

- Finally, MBC raises doubts over the central bank's lender of last resort role. As we have seen, bank deposits are convertible into cash on demand (albeit with interest penalties in some cases). However, the flows that we have discussed in this section could mean that perfectly well-run and solvent banks might find themselves short of reserves. Would the central bank still offer the convertibility guarantee if such a shortage arose, as it well might, in a period of tight MBC?

$D_g(+)$ . Provided that the government does not spend the funds it receives from banks (shown by  $D_g(+)$ ), there is no immediate change in the money supply but since banks' reserve ratio ( $R/D_p$ ) has fallen, banks will need to reduce their lending and deposits as a secondary effect. The technique is not used in practice, though a rise in interest rates on government bonds is likely to be a side effect of any rise in official interest rates intended to reduce the money supply (or rate of growth).

#### (6) Quantity effects on banks' holdings of government securities

An alternative to price inducements to increase or decrease holdings of government debt is regulation. Requiring banks to hold more or less government debt has broadly similar effects upon the money supply and on bank liquidity to those resulting from price. However, if the return on government securities is below the rate required to justify the holdings in the absence of regulation, then the regulation acts as a tax on banking and a subsidy on government debt. One could then take the standard view that the effect of the tax will be a lower level of bank intermediation than would otherwise be the case, and a smaller money stock. There have been occasional examples of balance sheet regulations which influence bank holdings of government debt – the UK regulations embodied in *Competition and Credit Control* (1971–81) provide an example – but they are generally rejected now along with most direct controls.

Since 1993, banks in the Group of 10 have had to observe rules on capital adequacy laid down by the 'Basel Committee'. This requires banks to observe a specified ratio of capital to 'risk-adjusted assets'. Government debt has a low risk weighting and banks may sometimes decide to hold more government debt in order to lower the value of their risk-adjusted assets, but these regulations are aimed at improving and maintaining the solvency of banks and not at monetary control. The regulation of banking and other financial activity is discussed further in Chapter 25.

#### (7) Price effects on bank advances to the non-bank private sector

Through its lender of last resort role a central bank can raise (lower) the level of short-term interest rates. Other things being equal, this moves the non-bank private sector up (down) its demand curve for bank credit. Assuming some negative interest-elasticity, bank advances fall (rise). At first glance, the process could scarcely be simpler. However, there are some problems.

Firstly, we are here discussing stocks but in the real world the authorities are concerned with *flows*. In a world where nominal magnitudes are generally increasing it is the rate of increase that the authorities seek to influence. Experience suggests that the demand for new bank lending is not very interest-elastic while the flow of such lending is subject to a wide variety of other influences. With a low interest-elasticity, the

behaviour of the curve itself becomes critical. In a recession, for example, it seems plausible that ‘distress borrowing’ will, for a period at least, push the curve to the right. If the recession is itself related to the present conduct of monetary policy then we have a malevolent circle in which a rise in interest rates pushes us up an (inelastic) curve, which simultaneously moves outward.

Secondly, while this mechanism appears not to involve the demand for money, a rise in rates will make bank deposits *more* attractive. We saw in (1) above that if deposit rates were sticky (or could be held down) then any rise in interest rates would make holding money less attractive. This would reinforce the negative effect of a rise in interest rates on lending. However, in many European countries now, even sight deposits bear market-related interest rates. This means that a rise in official rates pushes up money’s own rate as well and this secondary mechanism is lost. Nonetheless, changes in short-term interest rates are currently the favoured mechanism of monetary control.

#### (8) Quantity effects on bank advances to the non-bank private sector

If price effects on bank advances have been the cornerstone of recent monetary control, quantity effects were their predecessors. Quantity controls usually consisted of target rates of growth of bank credit being laid down by the central bank, with penalties if they were exceeded. The obvious advantage of quantity over price controls is that they avoided fluctuations in interest rates. In particular, a tight monetary policy could be operated without high interest rates. However, any direct control must involve non-price rationing and, with it, the risk of inefficiency and inequity. Furthermore, the control is likely to be evaded as the passage of time pushes the cost of complying towards the cost involved in circumvention. In the present climate, which favours free markets, the disadvantages of direct control are felt to outweigh any advantage.

#### (9) The size of the PSNCR

Other things being equal, the larger the PSNCR the greater will be the amount that the government has to borrow from banks and, *ceteris paribus*, the greater the flow of new loans and deposits. This is demonstrated in Equation 12.13. Adjusting the PSNCR for monetary control purposes is impractical, however, for reasons which we saw in Section 12.4. Most EU governments are more concerned with reducing their

PSNCR in order to meet the Maastricht criteria. These conditions have monetary implications, but rather more for interest rates than for money supply.

#### (10) Price effects on government debt sales to the NBPS

We have seen that selling government debt to non-banks reduces the money supply. The sequence is  $D_p(-)$  matched by  $D_b(-)$  for commercial banks. At the central bank,  $D_p(-)$  is offset initially by  $D_g(+)$ . This may be followed by  $D_g(-)$  matched by  $L_g(-)$ . Banks’ reserve ratio is also reduced and banks may need to make multiple reductions in loans and deposits (as described in Box 12.4). This is the process that is often described as ‘open market operations’.

Selling government debt to the general public at interest rates higher than those currently prevailing is often a feature of a tight money policy, but it is intended more to limit the quantity of new money created by bank lending to government rather than to achieve a particular quantity change in reserves. The relevant framework is Equation 12.13 rather than Equation 12.8.

Anything that makes government debt, of any sort, more attractive to the non-bank public will have these effects. New savings products, with attractive terms and conditions, have often been developed in phases of tight monetary policy.

#### (11) Quantity effects on government debt sales to the NBPS

Monetary authorities do not normally impose requirements that the general public should lend to the government. Forced loans have had a bad press since numerous monarchs throughout Europe were variously deposed and/or executed for adopting such a policy.

#### (12) Price effects on the external impact on deposit growth

The objective here is to cause transactions involving foreign exchange which will make the domestic money supply grow more slowly. In the flow of funds identity Equation 12.13 is represented by  $\Delta ext$ . Remember that  $\Delta ext$  is shown as contributing positively to a change in the money supply. If we take Germany as an example, then this will happen when overseas citizens buy goods or assets in Germany. Either the overseas buyers make payments to sellers in Deutschmarks (in which case Deutschmarks previously held outside Germany and thus excluded from the official measures

of money are now included) or overseas buyers buy Deutschmarks from the *Bundesbank*, which takes foreign currency in exchange. The effect is the same as if the central bank had bought government debt from non-banks, paying them with domestic currency.

In order to reduce monetary growth, the mechanism needs to be reversed. In other words a capital *outflow* needs to be induced. And herein lies the major difficulty with the manipulation of external flows for monetary control purposes. The main objective of a tight money policy is likely to be a reduction in the rate of inflation, usually to a rate which is similar to those of major trading partners. In other words, the purpose of tight money is to ensure that the country's balance of payments either improves or does not deteriorate. And yet tight money, engineered via external flows, requires that the balance of payments gets worse.

### (13) Quantity effects on the external component of deposit growth

Quantitative measures mean exchange controls. Restricting outflows makes the money supply higher than it would otherwise have been while restricting inflows has the opposite effect. Germany has used control on inflows to reduce the rate of monetary growth and one might view the relaxation of exchange controls in the UK in 1979 (in the hope of encouraging outflows) as a sort of negative inflow control. The advantage of exchange controls is that appropriate flows can, in theory, be created without disturbing the balance of payments. However, the first phase of the planned movement to a monetary union (initiated in July 1990) included the removal of all exchange controls between European countries. This has been largely completed and it is difficult to see, even if progress towards unification slows to a halt, that this policy will be reversed.

## 12.6 Summary

There are numerous theoretical and practical difficulties involved in defining money. The former stem from a circular argument: we cannot say what assets function as money unless we know what it is that money does, but we cannot be sure what role is being played by money itself unless we know which assets we should be studying. The latter stem from the fact that whatever functions as money is defined by custom, and customs change.

In spite of these difficulties the monetary authorities in any country have to take a stand and define money in some practical way. The uncertainty is reflected in the fact that money in most countries is defined both 'narrowly' and 'broadly'. At the moment, all commonly used measures of money are dominated by bank deposits. It follows therefore that anything that causes a change in the size and composition of bank balance sheets is likely to cause a change in the quantity of money and conversely that any change in the quantity of money must be reflected in changes in banks' balance sheets.

There are two ways of modelling the money creation process. One, the base-multiplier approach, focuses upon stocks and makes discretionary decisions by the authorities central to changes in the quantity of money. The other, the flow of funds approach, focuses upon flows and sees expansion as the norm. In this model, the authorities occupy a subordinate role in which they do what they can to influence the demand for new loans and thus the rate at which the money supply expands.

The base-multiplier model points to control of the monetary base, or bank reserves, as the obvious means of controlling the money supply; the flow of funds model points to action to control bank lending. At present, 'market' methods of influence are preferred and that essentially means using interest rates.

### Key concepts in this chapter

Real income	High powered money	Mandatory ratio
Real wealth	Bank reserves	Prudential ratio
Money income	Narrow money	Base-multiplier model
Unit of account	Broad money	Flow of funds model
Medium of exchange	Sight deposits	Market methods of control
Store of wealth	Demand deposits	Price effects
Standard of deferred payment	Time deposits	Direct controls
Legal tender	Certificate of deposit	Quantity effects
Monetary base	Divisia	Disintermediation
	Reserve ratio	

## Questions and problems

- 1 Distinguish between 'broad' and 'narrow' measures of money.
- 2 Why do countries usually have several official measures of money?
- 3 For your own economy, find recent figures for GDP (at current prices) and for a measure of narrow money and a measure of broad money. Calculate narrow money velocity and broad money velocity.
- 4 Why is the money supply endogenous?
- 5 Explain what is meant by the phrase 'loans create deposits'.
- 6 Using a flow of funds framework, explain the effect upon the creation of new deposits of:
  - (a) an increase in the PSNCR, *ceteris paribus*;
  - (b) a reduction in the central bank's official dealing rate, *ceteris paribus*.
- 7 Summarize the arguments against quantity controls on bank deposits and bank lending.

## Further reading

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### Websites

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[www.federalreserve.gov/releases/H3](http://www.federalreserve.gov/releases/H3) and  
H6 [t12.2]

## Chapter 13

# The demand for money

### *What you will learn in this chapter:*

- The reasons why economic agents wish to hold money
- The effect of changes in money supply on income
- The basis of an aggregate demand function for money
- The problems in testing demand for money functions
- The implications for monetary policy of the nature of the demand for money

### 13.1 Introduction

Having considered the money supply process, we begin this chapter by looking at the economic significance of changes in the supply of money – in particular, the relationship between the supply of money and nominal income (i.e. GDP at market prices). Changes in the level of nominal income may, in turn, affect the price level and/or the level of real income and it is these that are of interest to voters and policy makers. This series of linkages between the money supply, prices and real income (and hence employment) is frequently referred to as the **transmission mechanism of monetary policy**. The conventional approach is to consider these through the interaction of the supply of money with the demand for money – the quantity of money that economic agents *wish* to hold at a given time. This requires us to look at the factors that influence the demand for money. Our final step in the chapter will be to bring material concerning the supply of and demand for money together to consider the principal issues facing monetary policy.

### 13.2 The demand for money – an introduction

We have seen that people, in the aggregate, hold a stock of wealth. The income derived from wealth may be consumed or saved. Savings from income add to the stock of wealth. The decision as to how to hold wealth (that is, which types of asset to hold) will influence the amount of income derived from wealth and hence the ability to consume in the future. The decision will involve some trade-off between the expected rate of return on different types of assets, the risk associated with holding those assets and the fluctuations in return on them. This risk may relate to a possible loss in the nominal value of an asset or to a loss in real value through inflation. It follows that we may compare different assets (for example, financial versus real assets; equities versus bonds) and ask how much of each people are likely to hold in their portfolios under different circumstances. Money is one possible component of wealth and hence in asking about the demand for money we are asking why people choose to hold some of their wealth in the form of money, which pays a zero or low rate of

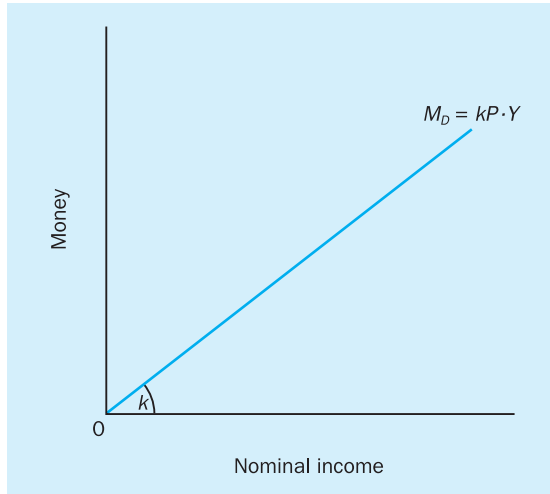
interest, rather than in the form of other assets which bear a higher rate of return. We also wish to consider the circumstances under which the proportion of wealth held in the form of money will change.

We begin with the simple proposition, based on the role of money as a **medium of exchange**, that people need to hold part of their wealth in the form of money at times when they wish to purchase goods and services or settle bills for previous purchases. This suggests that the amount of money people choose to hold on average over a period must be related to the average amount of expenditure people wish to undertake during that period and to the nature of the receipts and payments system. For instance, someone who knew that he had to settle a credit card bill for a known amount on the fifteenth of the month or wished to purchase directly a particular good at a known price on that day, would be able to convert other assets into money in sufficient time to make the payments. How long he would need to hold the known amount of money would depend on how quickly other assets could be converted into money and on such things as the manner in which that was done, the acceptability of cheques and the opening hours of banks. There would be no sense in anyone holding more money than strictly needed because higher rates of return could be obtained on other assets. Thus, income received in the form of money on the first of the month would be converted into other assets and only converted back into money in sufficient time to make the payments on the fifteenth.

If we were to assume that the institutional arrangements mentioned above changed only slowly over time, changes in the amount of money required in the aggregate would depend entirely on the determinants of planned expenditure. For households, this would depend on the form of the consumption function that we adopted, but we might say that the demand for money was determined essentially by the level of current or permanent income and/or the level of wealth. Although this is a considerable simplification, it provides us with a sufficient basis for considering the impact of changes in the supply of money on nominal income. It also allows us to write a simple money demand equation:

$$M_D = kP \cdot Y \quad (13.1)$$

where  $M_D$  is the demand for money,  $P$  is the price level,  $Y$  is aggregate real output and hence  $P \cdot Y$  is the current level of nominal income.  $k$  is a constant expressing the



**Figure 13.1** The demand for money and nominal income

relationship between nominal income and the demand for money. Figure 13.1. shows this information in the form of a demand for money curve.

We have noted above several factors of relevance to this diagram. Firstly, although we mentioned above the possibility of using other measurements of income, we have settled in the diagram and equation for current nominal income. This is usually done because statistics are readily available for current income. Secondly, we have noted that changes in the receipts and payments system will influence the relationship between expenditure and the demand for money. These will cause  $k$  to change and the curve to shift over time. One might, for example, expect the financial system to become more sophisticated over time and to allow people to economize on the use of money. This would cause  $k$  to fall and the money demand curve to rotate to the right. Thirdly, it is apparent that other factors that influenced the relationship between income and consumption expenditure (the consumption function) would influence the relationship between income and the demand for money. Thus, the curve may move because of changes in, amongst other things, the level of wealth, the distribution of income or the age composition of the population.  $k$  is therefore not likely to be constant but may change only relatively slowly over time.

### 13.3 The transmission mechanism of monetary policy

The usual analysis of monetary policy assumes that the supply of money is exogenous. Thus, if the supply of money is different from the demand for it, the money market is only able to move to equilibrium if the demand for money adjusts to make it equal to the existing money stock. This will happen if those variables that influence the demand for money change. If the aggregate supply of money is greater than the existing demand for it, individual economic agents will be holding excess money balances and will seek to reduce their holdings of money. However, if the money stock is fixed exogenously,<sup>1</sup> the actions of individuals cannot reduce the aggregate supply of money. It follows that we are interested in how the attempts of individuals to reduce their holdings of money might change economic variables in such a way as to make them willing to hold more money.

How might this work? A single economic agent will seek to exchange any excess money balances for another type of asset – one which is a close substitute for money itself. The most likely close substitutes for money will be highly liquid assets that can quickly and with little risk of loss be converted into money – assets such as other short-term financial assets that may be sold in organized markets and whose price is largely determined by the money value of the asset at

#### More from the web

The web is not rich in material on the demand for money but if you enter 'demand for money' in Google, you will find some useful material, such as a very introductory outline on <http://economics.about>, a set of multiple choice questions on [www.bized.ac.uk](http://www.bized.ac.uk), some revision notes on [www.revision-notes.co.uk/revision/](http://www.revision-notes.co.uk/revision/) and an historical survey from the *Indian Economic Journal* on [www.indianeconomics.org/material/](http://www.indianeconomics.org/material/). If you try to find some of these directly you are told that you are not authorized to view the material, but try it through Google and up pop the desired pages – another wonder of the web.

<sup>1</sup> An exogenous money supply is one where the central bank determines the money supply using techniques such as monetary base control. The mechanics of this process were examined in Section 12.4.

maturity (bills, bonds maturing in the near future). As the demand for these assets rises, their prices increase and the yield on them falls, making them less attractive. This could have two effects: (a) it could cause the demand for money to increase since the interest rate being received for forgoing an element of liquidity will have fallen; (b) it will make less liquid financial assets relatively more attractive and cause part of the impact of the excess money balances to shift to them. We can thus imagine the increased demand for non-money financial assets moving along a chain organized in terms of degrees of liquidity. Clearly, however, if effect (a) is strong, effect (b) will be weak. Thus, one thing we need to know is the strength of the relationship between the rate of interest on other assets and the demand for money. Should the demand for money be highly interest-elastic, excess money balances would disappear quickly and there would be relatively little impact on anything else in the economy. Starting from a position of equilibrium in the money market, an exogenous increase in the supply of money would cause a small fall in interest rates and this would be sufficient to persuade economic agents to hold the larger quantity of money now in existence.

Suppose, however, that the demand for money is not interest elastic: effect (a) is weak and effect (b) is strong. This is likely to mean that an exogenous increase in the supply of money will have a considerable impact on the interest rates on non-money assets. As interest rates fall, we would expect investment expenditure (on new capital equipment, new buildings, stocks of intermediate goods held by firms) to increase. We would also expect increased demand in the housing market and a rise in expenditure on consumer durables since interest payments represent a significant part of the cost of them to the average household. As incomes and expenditure rise, people will need to hold more money to carry out their expenditure plans. The demand for money rises and we return to equilibrium. In this second case, then, we might have a strong relationship between the supply of money and nominal income, causing an increase in prices and/or an increase in output and employment.

From the point of view of monetary policy, there is an extra issue. For the authorities to be able to determine the rate of inflation through control of the rate of growth of the money supply, it is not sufficient that there be a *strong* relationship between the supply of money and the price level. The relationship needs also

to be *predictable*. This will be the case if the demand for money is stably and predictably related to interest rates and real income.

Many complications can be introduced into this basic story. One textbook idea is that there are no close substitutes for money – defining money as the only asset that can be used in final settlement of debt makes it unique. If no asset is an adequate substitute for money, the idea of the effect of an increase in the supply of money moving along a chain of assets in terms of degrees of liquidity disappears. People holding excess money balances might use them to acquire any other type of asset, real or financial. If they acquire real assets, there may be a link between the money supply and nominal income that is not dependent on the impact of an increased supply of money on interest rates. In practice, however, liquidity is bound to be an important consideration in the choice among assets, especially for households and firms which need to make regular payments on outstanding debt. In any case, this approach provides a definition of money which is empirically extremely difficult to pin down, especially if one is trying to establish a relationship between money and nominal income rather than between money and total transactions of all kinds (including expenditure on secondhand goods and financial assets).

Of much greater concern is the objection to the assumption of an exogenous money supply. Let us assume instead an exogenous level of consumer confidence. Suppose that consumer confidence rises, leading people to be prepared to go into greater debt in order to trade up in the housing or motor vehicle markets or purchase new consumer durables. To the extent that banks are willing and able to meet this increased demand for loans, expenditure, income, bank deposits and the money supply all increase. The same event (the increased confidence) generates increases in both the demand for money (to carry out the increased expenditure) and the supply of money. It is true that the central bank may be able to make it difficult for banks to meet the increased demand for loans, but only at the expense of higher interest rates. It is also possible to object to the notion of exogenous consumer confidence but to do so is to contradict what has become the dominant explanation of cyclical variations in aggregate consumer spending. We shall return to issues such as this at the end of this chapter after we have looked more closely at the demand for money.



### 13.4 The demand for money – a more complete approach

There are two basic problems in the analysis of the demand for money. Firstly, the demand for money cannot be measured directly. We can (once we have agreed upon a definition) measure the money stock. We cannot, however, know whether people wish to be holding that quantity of money under the existing circumstances. This is of great importance since any impact from the money markets on the rest of the economy will come about only when demand is not equal to supply – when demand is greater than supply and people attempt to increase their money balances by selling other assets; or when demand is less than supply and they seek to use their excess money balances to acquire other assets. The simplest approach to this problem is to assume that people are always in equilibrium or, at least, move very quickly to a new equilibrium position following a shock in the form of an unexpected increase or decrease in the money stock. Alas, empirical studies do not appear to bear this out.

The second basic problem concerns the level at which to conduct the analysis. In relation to the supply of money, we are dealing with the money stock for the economy as a whole. However, because the demand for anything is subjective and varies from person to person, the natural way for an economist to consider demand is at the household or microeconomic level. Thus, we ask what proportion of its wealth a household will hold in the form of money under different circumstances. Nonetheless, since we wish to deal with the interaction between supply and demand, we ultimately wish to come to conclusions about the *aggregate* demand for money for the economy. It is common practice to assume that the demands of all households could, in theory, be added together to arrive at this total, although it is also usual to admit the existence of serious aggregation problems. This last is an understatement. It is just not possible to arrive at an aggregate demand for money by adding up household demands. Thus there is inevitably a gap between theoretical and empirical studies of the demand for money – all demand for money functions which are tested are macroeconomic relationships between the aggregate demand for money and other economic variables. These empirical analyses of the aggregate demand for money have come to dominate the subject. The nature of the econometrics used in those studies

has become more important than any underlying theoretical analysis. Nonetheless, we cannot understand the general nature of empirical money demand functions without some consideration of theory.

#### 13.4.1 The theory of the demand for money

We have seen that our interest in the demand for money from the point of view of the transmission mechanism resolves itself into three questions – the extent to which the demand for money changes (a) as interest rates change and (b) as real income changes; and the stability of the relationship between the demand for money and interest rates and real income.

We suggested in Section 13.2 that the demand for money should be determined essentially by some measure of income or wealth. There are three problems with this story. Firstly, the conversion of money into other assets and back again is not costless. It may involve brokerage fees (in the purchase of bonds or equities, for example); it will certainly take time and there may also be travel and information costs. Some costs will be related to the size of the amount being transferred; others will be fixed costs. These costs must be set against the extra income that would be earned from holding assets other than money, i.e. against the interest rate differential between other assets and money. Given that some of the costs are fixed, this may mean that it would not be worthwhile for people to convert small amounts of money into other assets and back again for limited periods of time. People with low incomes may simply hold their wealth in the form of money. In the aggregate, the introduction of *transfer costs* into the analysis has two effects:

- It affects the relationship between income and the demand for money since the decision as to whether or not to convert money into other assets and back will depend on the size and the form (fixed or variable) of the transfer costs; in terms of Equation 13.1 and Figure 13.1, it causes  $k$  to change and the money demand curve to rotate.
- It introduces a relationship between the demand for money and the differential between the interest rate payable on other assets and that payable on money.

This latter relationship plainly will be negative since, given the level of transfer costs, the greater the interest differential is, the more worthwhile it will be to hold

other assets rather than money. There is an obvious simplification here, however. We have distinguished two rates of interest – that on money itself and that on ‘other assets’; but since money may be switched into a variety of assets, each with a different rate of return, we are bound to have a problem in choosing an average or ‘representative’ asset to compare with money. Indeed, the average rate of return on money itself will depend on the definition of money we are using! Let us leave this to one side for the moment and concentrate on another issue – the stability of the relationship between interest rates and the demand for money. We could treat the inclusion of interest rates into the analysis in terms of Figure 13.1. It could have two influences on that diagram:

- 1 changing the value of  $k$  and causing the curve to rotate;
- 2 moving the whole curve so that it has a positive intercept on the vertical axis, since we are suggesting that changes in interest rates could influence the demand for money quite independently of changes in the level of income and expenditure.

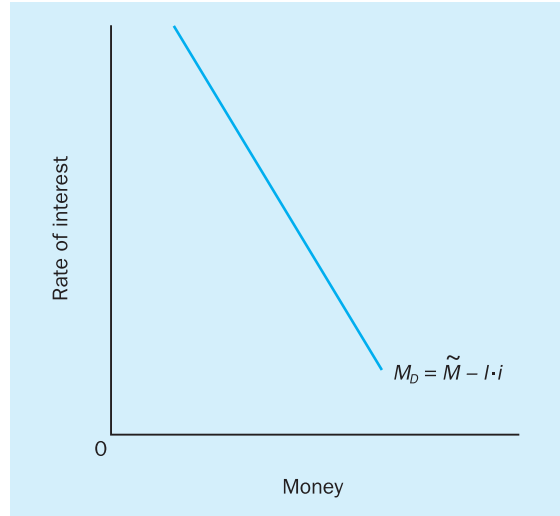
However, the relationship between the interest rate and the demand for money is of sufficient importance to warrant being considered separately. Thus, we may write:

$$M_D = \tilde{M} - l \cdot i \tag{13.2}$$

where  $\tilde{M}$  is the level the demand for money would reach, *ceteris paribus*, at zero interest rate;  $i$  is the interest rate on a representative asset and  $l$  expresses the *ceteris paribus* relationship between the representative interest rate and the demand for money. In Figure 13.2, we show the relationship between the demand for money and interest rates.

Since we can calculate the impact that a change in interest rates will have on the interest income we receive from any given mixture of non-money and money assets we should have no problem in constructing such a demand schedule for money with interest rates as the dependent variable.

We begin by assuming that transfer costs, incomes and expenditures are given and known. We also assume that the interest rate on money itself does not change. Then, as shown in Figure 13.2, the demand curve for money will slope down to the right. The curve will shift when incomes or transfer costs change. Also, since we have used a single measure of the rate of interest on the vertical axis, the curve will shift when the interest rate



**Figure 13.2** The demand for money and the rate of interest

on money itself changes, thus changing the relative interest rate between money and other financial assets. On the basis of our argument so far, the demand for money curve should otherwise be stable. Exercise 13.1 deals with the direction in which the curve will shift with changes in the underlying variables.

**Exercise 13.1 Influences on the demand for money curve**

- 1 Consider how the demand for money curve in Figure 13.1 (the curve relating the demand for money to *income*) will change as a result of the following:
  - (a) an increase in the proportion of retired people in the population, thus reducing the economy’s propensity to save;
  - (b) an increase in wealth;
  - (c) an increase in the rate of interest.
- 2 Consider how the demand for money curve in Figure 13.2 (the curve relating the demand for money to *the rate of interest*) will change as a result of the following:
  - (a) an increase, *ceteris paribus*, in the rate of interest on *money*;
  - (b) a fall in income;
  - (c) an increase in wealth;
  - (d) an increase in the costs of moving from money to other assets and back.

The second problem with our initial story is that people do not often know exactly how much money they will need to settle debts or make purchases; nor, in many cases, will they know exactly when the payment will need to be made. Given that there is likely to be some cost associated with failing to make the correct payment on time (extra interest on credit card bills, penalty interest on overdrawn bank accounts, inconvenience, loss of customers etc.), people will normally choose to hold more money and to hold it for longer periods than they strictly need to meet their monetary obligations. One way of modifying our story would be to follow the approach of Keynes in *The General Theory* and distinguish among *motives* for holding money. Thus, we would distinguish so far between the **transactions demand** for money (the basic relationship between income and the demand for money, on the assumption that both the size and the timing of the payments we needed to make in money were known) and the **precautionary demand** for money which would allow for the uncertainty associated with the amount and timing of monetary payments.

The advantage of this approach is that it allows us to think separately of the factors that might influence any additional amount of money demanded over and above the minimum amount required for transactions purposes. Keynes stressed the link between the additional precautionary amount held and the total required for transactions purposes. Thus, the standard treatment of the precautionary demand was to see it as being stably related to the transactions demand and hence to income. Transactions and precautionary balances were amalgamated to form **active money balances**. However, just as with transactions balances, precautionary balances will be related to the rate of interest since the costs of finding oneself with less money than needed for transactions purposes may also be weighed against the extra interest payments available from holding assets other than money. Box 13.1 discusses how the precautionary demand for money may be included in the demand for money diagram.

A more organized assessment of the precautionary demand for money is possible through an expression of the uncertainties surrounding the transactions motive in terms of probabilities. Clearly, the difficulty of assessing how much money would be needed would increase as the variability of incomes (and hence expenditures) increased. Other things being equal,

### Box 13.1 The demand for money curve and the precautionary demand

#### Consider Figure 13.1

Including a precautionary demand for money would increase the amount of money demanded for each level of income. If the precautionary demand was genuinely just an extension of the transactions demand,  $k$  would increase but the form of the equation would not change and the demand curve would rotate to the left.

#### Consider Figure 13.2

Incorporating a precautionary demand for money could be considered as just another reason for the demand for money to be higher at each level of the interest rate. The demand for money curve would shift out to the right.

It would be logical, however, to assume that people balance the utility gained from holding additional money balances to protect themselves against uncertain patterns of expenditure with the cost of holding these balances (the rate of interest forgone). Then, incorporating a precautionary motive into Figure 13.2 would shift the curve further away from the original curve at lower rates of interest than at higher rates. The slope of the demand for money curve would change. One could also incorporate floors and ceilings of money holdings into the diagram, but not very satisfactorily.

people would hold higher precautionary balances the more variable income levels were. This introduces the idea that the demand for money is not related simply to income levels but to the variance of incomes. This stochastic approach to the demand for money led to the development of models suggesting that the money balances held by an individual would lie between a floor and a ceiling. While one can continue to identify an equilibrium or return point (based upon the assumptions made about the nature of transfer costs) to which money balances eventually return, actual holdings only return to that point when they reach either the floor or the ceiling. As money balances fall below the return point, there is now only a probability that the amount held will be too low. It is only when that probability becomes sufficiently high (when the floor is reached) to offset the income gain from holding less money that any action would be taken. Again, money balances will be allowed to rise until a point (the ceiling) when

the probability that the extra balances will be needed has become sufficiently small to be outweighed by the additional income available from switching into other assets.

Putting our argument together, we can see that the demand for money should depend on the differential between the interest rates on non-money assets and money in comparison with the transfer costs of switching between these two groups of assets *and* the risk arising from the lack of certainty regarding the amount of money balances actually needed for transactions purposes. Since we have assumed that we can express this risk in terms of probabilities, it should follow that its existence should not upset the stability of the relationship between interest rates and the demand for money. This relationship will change if people's attitude to risk changes (if they become more or less risk averse). An assumption about the existing attitude to risk is thus another factor underlying the demand for money curve. Changes in attitude to risk will cause the curve to shift in exactly the same way as would changes in income, transfer costs or the rate of interest on money but there is no reason to believe that it is likely to happen at all often.

Despite the fact that the distinction of a precautionary motive allowed careful analyses of precautionary balances, the motives approach has always worried economists. This is because the distinction of a number of motives gives the feeling that one should be able to calculate the amount of money held for each motive and then simply add them up to produce a total demand for money for any household. However, this is not the case with the transactions and precautionary demands since both are influenced by the interest rate differential between money and non-money assets. Thus, a decrease in the interest rate on non-money assets would, *ceteris paribus*, produce an increase in the money balances held but those extra balances would be transactions balances if they turned out to be needed for transactions purposes but precautionary balances if they were not so needed. In other words, the same balances could satisfy both motives.

The third inadequacy in our basic demand for money story is that it does not take into account the fact that the capital value of non-money assets may change while they are being held whereas the nominal value of money itself remains unchanged over time. One may choose to hold a non-money asset because of the higher interest rate payable on it but this would not be profitable if the capital value of the non-money

asset fell before one needed to convert it back into money for transactions purposes. It follows that the decision as to how much money should be held must also take into account the risk that the value of non-money assets will change in the near future. Other things being equal, people will hold more money than is needed for transactions purposes if they feel that the money value of non-money assets will fall in the near future. On the other hand, to turn around a common warning issued to investors, the value of assets may rise as well as fall. Anyone who thought that the value of non-money assets was likely to rise would seek to economize on the holding of money balances in order to increase the capital gains available to the holders of non-money assets. It is this motive for varying the money balances that people hold which Keynes called the **speculative demand**.

Any analysis of the speculative demand, then, requires us to develop a theory of the formation of expectations regarding the direction of price changes of non-money assets. This introduces a complication since one of the major influences on the price of non-money financial assets is the interest rate in the economy. Indeed, if one takes as the representative non-money asset a non-maturing bond that produces a regular income fixed in money terms, changes in the general rate of interest in the economy will be the only influence on its price. Thus, what we need is a theory of the formation of expectations about future interest rates.

In itself this is no problem. Consider, however, the position if the existing rate of interest is one influence on people's expectations regarding likely future changes in that rate. We have so far argued that an increase in the interest rate on non-money assets will, *ceteris paribus*, cause the demand for money to fall. Suppose, however, that this increase engenders in people a belief that a further change in interest rates will soon follow. They might believe that the interest rate is now higher

#### More from the web

If you would like some feel for the quantity and nature of academic research on the demand for money, try <http://ideas.repec.org> or [www.ideas.uqam.ca/](http://www.ideas.uqam.ca/). Enter 'demand for money' in the search facility on the home page and up will come a long list of papers – in June 2004, the request produced 1,489 responses! When you look at the titles of the individual papers, be prepared to be frightened.

than is sustainable and believe that it will soon fall again or they may feel that the rise signals the beginning of a period of interest rate rises and that it may soon be moving up again. Either way, the change in interest rates will have influenced expectations regarding the prospect of capital gains or losses from holding non-money assets and thus will have influenced the speculative demand for money. Yet another possibility is that people believe that the interest rate will remain at its new level or, at least, that they have no reason for believing that movement in one direction was any more likely than movement in the other.

If they believed that interest rates would soon fall again, they would believe that holding non-money assets would produce a capital gain in the future and thus would want to hold *less* money than would be suggested from our earlier two motives. That is, the impact of the initial interest rate rise on the demand for money would be more strongly negative than would otherwise be the case (the demand for money would be more interest-elastic). The reverse belief about the future direction of interest rates would cause people to hold more money than previously suggested – the increase in interest rates would have two counteracting effects: the demand for money falling for transactions and precautionary motives but increasing on account of the speculative motive. A belief that the interest rate was likely to remain unchanged following the initial rise would, of course, cut the link between the existing interest rate and expectations regarding future movements in it.

Much depends in this analysis on the nature of the uncertainty regarding future interest rate changes. If we believed that the world was sufficiently predictable for us to be able to calculate probabilities about the future direction of interest rate changes and hence about future non-money asset prices, we could incorporate these into our analysis. We would make an assumption about the probable direction of change and this would become yet another element underlying the demand curve for money. Unless the behaviour of the economy (or of the people running it) changed significantly over a period of time, we would have no reason to revise our probability calculations and there would be no reason for the demand for money curve to shift. We would still believe that the relationship between interest rate and the demand for money was a relatively stable one.

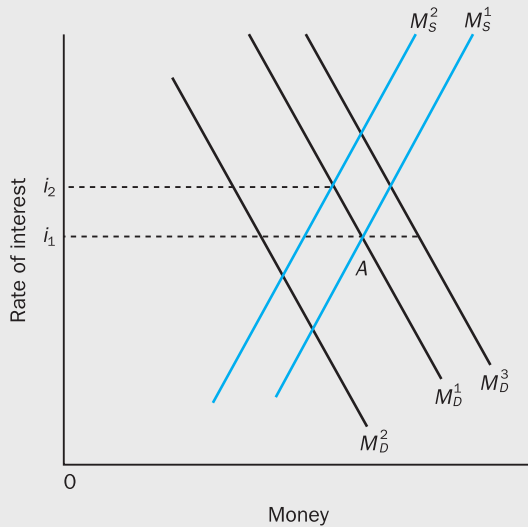
Suppose, however, that we did not have sufficient knowledge of the economy and its functioning to have

any clear idea of what might happen next – that we had no adequate basis for assigning probabilities to possible future changes in interest rates. We would still need some basis for our decisions and so we would search for some rough and ready rule of thumb: a belief, for example, that some particular level of interest rates was the ‘normal’ level and that any movement away from it would produce a belief in a return to it. Such rules of thumb may be subject to sudden and not easily explicable change. Thus, we may, for no apparent reason, alter our belief about the ‘normal rate’. In this case, *even if there were no change in the existing interest rate*, we might believe that it was about to change. This would produce a change in the demand for money and the demand for money curve would be subject to sudden shifts. The relationship between the demand for money and the rate of interest would, in such a case, be unstable. The demand curve, as shown in Figure 13.2, would move unpredictably and may do so because of changes in the supply of money itself. The effects of this are shown in Box 13.2.

It is clear from this discussion that speculative money balances cannot simply be added to (or subtracted from) the demand for money which might arise from the other two motives. If people hold larger money balances than would appear to be necessary, this could be for either precautionary or speculative motives and, since both may be influenced by the existing interest rate, it is not possible to separate the two. The same sum of money may act to protect them against the risk of changes in both the amount of money they need for transactions purposes and the price of non-money assets.

Nonetheless, the above consideration of reasons for holding money can suggest the factors which we need to look at in constructing a money demand function which might help us to predict the aggregate demand for money in the economy as a whole. Before we move on to this, however, we need to deal with another issue which we have so far neglected – the effect of changes in prices. We suggested above that money retained its value over time. Plainly, this is not true of its real value. An increase in the general price level reduces the real quantity of goods and services which may be purchased with the existing stock of money. This raises three issues.

Firstly, if the basic reason for holding money at all is to allow the purchase of goods and services, it is reasonable to suppose that as prices rise, people will need to hold more money to purchase the same quantity

**Box 13.2 The stability of the demand for money curve and monetary policy**

We begin with a positively sloped money supply curve,  $M_s^1$ , (see Section 12.4 for a discussion of the slope of the money supply curve) and a negatively sloped demand for money curve,  $M_D^1$ , which we assume to be stable. The equilibrium interest rate is  $i_1$  (at A). Assume next that the government wishes to push interest rates up in the hope of influencing the level of expenditure and the rate of inflation in the economy. We may assume an exogenous money supply and move the money supply curve to  $M_s^2$ , raising interest rates to  $i_2$  or we may

assume that the central bank is able to push the interest rate up directly to  $i_2$ , causing the money supply curve to shift – the difference is of no significance to us here. What is important, however, is whether the demand for money curve is stable. If it is, we remain at  $i_2$  and the government will have achieved the first part of its objective. Suppose, however, that people respond to the increase in interest rates by believing that the interest rate will soon fall again. This leads them to believe that the prices of non-money assets will soon rise and so they reduce their money balances to buy non-money assets. The demand for money moves back to  $M_D^2$  and government policy will have been less effective than had been hoped. Alternatively, return to our initial equilibrium position (A) and assume that the government has no plans to change policy. However, people fear that the rate of interest might rise. This might cause them to increase their demand for money (either because the speculative demand rises or because they increase their borrowing and advance spending plans) and the demand for money curve moves right. What happened next would depend on whether the money supply was exogenous or endogenous and on the impact that any change in the rate of interest would have on expenditure and income (remember that changes in income will cause the demand for money curve to shift). We cannot hope to analyse all such changes here but the important point is that any instability in the demand for money curve will make monetary policy difficult, if not impossible.

of goods. In other words, *ceteris paribus*, the demand for money in real terms will stay more or less the same as the price level changes. This can be handled in one of two ways – by incorporating the price level as one of the variables influencing the demand for money (with the price elasticity of demand assumed to be fairly close to unity) or by converting the dependent variable into the demand for real money balances by dividing the nominal demand for money by a general price index.

The second issue is more difficult and concerns not the price level itself but the rate at which the price level is changing (the rate of inflation). It is also related to an issue we raised earlier regarding the choice of interest rates. We need to return to the problem that there exists a range of non-money assets into which we could in theory switch any excess money balances and these different assets would have different rates

of return. The obvious response is to say, as we did earlier, that it is the differential between the interest rate on money and that on its closest substitute that is relevant. On the other hand, acceptance of the argument that money is a unique asset would imply that all other assets would be equally poor substitutes for it. This leads to the idea of incorporating into the demand for money function the rates of return on a range of alternative assets. It is usual to select three types – bonds, equities and real assets. That leads to the question of the rate of return on real assets. In comparison with money, the rate of return on real assets is the rate of inflation since it provides a measure of the rate at which money loses value. There is, then, a theoretical reason for including the rate of inflation as one of the independent variables we might use to explain the demand for money.

Thirdly, the importance of money as *the* liquid asset *par excellence* is based on the notion that money can be held without risk. Modest and predictable inflation does not call that idea into question to the extent that agents can protect themselves against inflation. This is no longer the case if rates of inflation are volatile and difficult to predict since the future real value of all financial assets including money itself becomes uncertain. However difficult it is to forecast future rates of inflation, economic agents must attempt to do so in order to make a rational decision regarding the holding of assets.

### 13.4.2 The aggregate demand for money function

Our practical aim in considering the demand for money is to discover whether the *aggregate* demand for money is stably and predictably related to real income and the rate of interest. Consequently, aggregate demand for money studies have centred on tests to try to discover whether or not this is the case. This usually takes the form of regression analysis in which the aggregate demand for money is expressed as a function of a number of independent variables. A logical starting point of such an analysis is to derive the independent variables we wanted to include in the demand for money function from the theory of the demand for money. This produces a list something like the following:

- The interest rate on representative non-money assets, possibly including the rate of inflation;
- The interest rate on money;
- The transfer costs of switching between money and non-money assets;
- The level of income;
- The variance of income;
- The expected change in the rate of interest;
- An index of prices.

There are several practical problems here. Firstly, there would be little point in including the interest rate on more than one non-money financial asset since interest rates on financial assets tend to move together. Furthermore, nominal interest rates may be strongly correlated with the rate of inflation. Thus, including *both* an interest rate on a financial asset *and* the rate of inflation would disturb the relationship between either one of them and the demand for money. However, omitting variables that would contribute to the explanation

of the demand for money results in the equation being mis-specified. Then, testing the equation might suggest an instability in the demand for money that would be removed if the equation were properly specified. Thirdly, transfer costs are difficult to measure since they vary from one individual to another and from one company to another depending on the circumstances. In any case, they are likely to change slowly over time, and so are usually left out of aggregate demand for money equations.

Fourthly, there are no objective *ex-post* measures of the expected variables included in the list above. The best that can be done is to estimate expected future values of variables on the basis of forecasts using currently available information (making a judgement in doing so as to the best available forecasting model). These estimates can then be entered into the demand for money equation on the assumption of rational expectations – that agents do, indeed, make use of the best available forecasting models. A more usual approach is to replace the expectational variable with an available proxy or to represent it econometrically in some other way (for example by a dummy variable or a trend term).

Fifthly, wealth and income present problems. Ideally, a broad, all-inclusive definition of wealth is required, but the broader the definition of wealth, the more difficult it is to obtain a satisfactory measure for it. In any case, since income can be viewed as a return on the holding of wealth (human and non-human), the inclusion of both a broad definition of wealth and income presents problems. Many alternatives have been tried, including narrower definitions of wealth, the use of permanent income and measures of consumption expenditure. All present difficulties.

Sixthly, we have no direct measure for the demand for money. All we can do is use the supply of money. If we were to make no other adjustments to the equation, this would be tantamount to assuming that the money market is always in equilibrium. Even if we accept this, we are left with the question of which measure of the supply of money we should use. This is complicated by the variety of definitions of money in use in different countries. Theories are of very little help here although concentration on the transactions demand for money leads in the direction of narrow definitions of money. In practice, econometricians are happy to accept the definition of money that yields the most accurate predictions and not worry about the theoretical justification for it. Problems have arisen in recent years

from changing definitions of monetary aggregates and financial innovations that change both the roles of financial institutions (and thus the extent to which their liabilities may act as money) and attitudes towards the various types of financial assets.

Finally, there is a problem with the time period covered by the studies. Supporters of the notion of a stable demand for money only claim stability in the long run. However, if the demand for money is unstable in the short run, we need to be able to explain why, and do it in such a way that this instability is compatible with long-run stability. Further, long-run studies (which typically use annual observations or temporally averaged data) face problems because the definitions of many of the variables change over time. In addition, some elements that are omitted from the equation because they are assumed to be constant, such as transfer costs and payment systems, clearly do change over time. In any case, the distinction between long-run and short-run studies is arbitrary. There is no theoretical definition of the long run in macroeconomics other than that it is the period necessary for the economy to return to equilibrium – a definition that is useless for empirical work.

The net result of these problems is that the standard regression equation used in demand for money testing is quite a long way removed from the theoretical arguments we have considered above. A standard aggregate money demand equation, linearized by taking logs, is:

$$\ln m_t = \ln \beta_0 + \beta_1 \ln Y_t + \beta_2 \ln i_t + v_t \quad (13.3)$$

where  $m$  is the real value of the money supply (the money supply divided by a price index);  $Y$  a measure of aggregate real income;  $i$  interest rate on a representative financial asset; and  $v$  a random variable. A common addition is the lagged dependent variable (the real value of the supply of money):  $\beta_3 \ln m_{t-1}$ . This simply accepts that there are bound to be time lags in adjustment and thus it is a reflection of the idea that a movement to a new equilibrium following a change in one of the independent variables will not be instantaneous. In the early days of testing it was assumed that these time lags would be quite short and thus that the role of the lagged dependent variable would not be very great. The other principal hopes of the testers of functions such as this were that:

- 1 the signs would be as indicated by the theory, most obviously a negative relationship between  $r_t$  and  $m_t$ ;
- 2 the constants would indeed turn out to be constant;

- 3 the independent variables ( $Y_t$  and  $i_t$ ) would between them predict a high proportion of the demand for money; and
- 4  $v_t$  would prove to be random, indicating that it did not incorporate a missing variable with a systematic relationship with the demand for money.

### 13.4.3 Testing the demand for money – the outcome

Studies in both the USA and the UK up until the early 1970s appeared to produce satisfactory results. The demand for money was found to be **interest elastic** but elasticities were relatively low. The majority of studies produced income elasticities close to unity. The demand for money appeared to be correctly specified in real terms. Time lags between interest rate and income changes and the demand for money seemed from long-run studies to be relatively short, although this was called into doubt in short-run studies. Crucially, demand for money functions appeared to be reasonably stable.

However, in the early 1970s the demand for money function began to show signs of instability in both the UK and the USA. In the US between 1973 and 1975, real money balances steadily declined, falling by about 7 per cent, whereas demand for money equations estimated with data for the 1950s and 1960s had predicted a mild decline in 1974 followed by a recovery in 1975. Thus, existing demand for money equations were seriously *overpredicting* the demand for money, whereas in the UK equations based on the 1950s and 1960s *underestimated* the demand for money. Equations also broke down in several other OECD

#### More from the web

Statistics on money supply for the different countries are available from the respective central banks. For a good list of addresses of central banks, try the Bank for International Settlements: [www.bis.org](http://www.bis.org). To calculate the velocity of money, you also need some national income statistics. These are also available from the central government sites of most countries. For the UK, try [www.statistics.gov.uk](http://www.statistics.gov.uk). Comparative statistics can be found on the OECD ([www.oecd.org](http://www.oecd.org)) and IMF ([www.imf.org](http://www.imf.org)) sites.

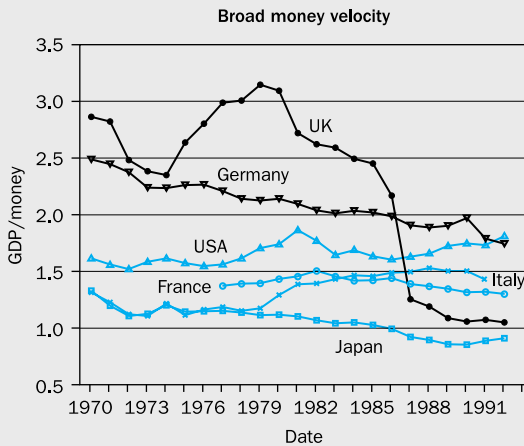


### Box 13.3 Changes in velocity

'Velocity' is the term given to the ratio of GDP at market prices to the stock of money. Strictly speaking, this is 'income velocity'; a less common measure of velocity is 'transactions velocity' which involves dividing total spending (including spending on intermediate and secondhand goods and on financial assets) by the money stock. Clearly, transactions velocity will always be much larger than income velocity. Our interest in velocity lies in the fact that if there is a stable relationship between

the quantity of money and total spending then it *may* be the case that controlling the quantity of money gives us some control over total spending. Notice that this requires that 'money causes spending' but a stable velocity does not guarantee this: velocity will be stable if 'spending causes money' in which case controlling money has no effect on spending. Stable velocity is only a necessary condition for a policy of controlling monetary growth.

Both our definitions of velocity recognize that we can divide by whatever measure of money we think appropriate. If we divide by M1, we will have a measure of narrow money velocity; dividing by M3 or M4 gives us broad money velocity. The chart shows the behaviour of broad money velocity in several countries, mainly from 1970 to 1992. It shows quite clearly that velocity is not constant! In some countries it rises over the period and in others it falls. Remember though that what matters is *stability*. Provided they can predict the path of velocity, governments can still operate a policy of monetary control (by adjusting the growth rate to allow for changing velocity). It is unpredictable and dramatic changes in velocity that make it impossible to set money growth targets. The chart shows why Germany maintained an interest in monetary targets while other countries, and the UK in particular, abandoned them.



countries. The problem showed up in ways other than the failure of equations to predict accurately. For example, extending the data used for estimating equations to include the 1970s produced changes in the coefficient on the lagged dependent variable which suggested unreasonably long adjustment processes. Things began to go wrong again in both the USA and the UK in the early 1980s when income velocity began to fall sharply and demand for money functions estimated on pre-1982 data seriously underestimated the demand for narrow money in the mid-1980s. Box 13.3 discusses changes in broad money velocity in six countries between 1970 and 1991.

Several explanations of these problems have been proposed, most of which have sought to preserve belief in the view that the demand for money is stable, in the long run. Firstly, and least disruptively, it has been argued that the demand for money remained stable even in the 1970s and 1980s but that the equations derived from the pre-1970s studies failed

to identify the stability because of faulty specification of the equation or the dynamics in the model. The fault thus lay with the econometrics and the problem could be overcome by altering lag structures or the functional form of the equation, especially by including important variables that had been omitted from the equation, such as a term representing relative prices of consumer durables, non-durables and services in addition to the general index of prices.

Secondly, it was argued that there had been changes affecting the arguments of the function, resulting in unpredictable shifts in the demand for money function and/or in the slope of the function. To retain belief in the long-run stability of the function, it was then necessary to argue that such changes were limited to a particular, dramatic period of time and that once the system had adjusted, long-run relationships would re-emerge. The problems in the early 1970s were attributed to a variety of causes including the change from an international fixed exchange rate system to floating

exchange rates and, in the UK, changes in the approach to the control of the money supply. The difficulties in the 1980s were overwhelmingly attributed to financial innovation and institutional change.

Institutional change is not new. Particular changes may affect the demand for money in different ways and thus to some extent their impacts may cancel out over time. Further, there is little to worry about if the changes occur steadily over time since their effects will be predictable. Problems only arise if changes are sudden and frequent or are induced by levels of, or changes in, other variables within the demand for money function. Financial innovations, for instance, may occur in waves, causing discrete short-term jumps in demand for money functions. Again, a period of prolonged high interest rates may encourage the development of financial innovations, allowing money balances held for transactions purposes to be reduced. Thus, there is the possibility of a ratchet effect – when interest rates are high, it pays to spend time and effort on the development of **financial innovations** such as the introduction of different types of bank accounts or the introduction of automated teller machines. Having been introduced, these innovations are not reversed when interest rates fall again because the costs involved are mainly set-up costs (e.g. computing hardware and software). Thus such financial innovation is likely to have both: (a) caused the constant to have fallen and (b) caused the interest elasticity of the demand for narrow money to increase (as shifts between demand deposits and high interest-bearing deposits have become much easier).

Attempts to reflect the effects of financial innovation in empirical work have been of several kinds. For example, it was argued that the problems of the 1970s could be overcome by including long-term interest rates in the function and redefining money, overcoming the problems arising from the growth of interest-bearing demand deposits by excluding them from the definition of money. A more usual approach was to incorporate additional variables into the money demand equation. For instance, instead of narrowing the definition of money it was possible to seek to cope with the increased payment of interest rates on demand deposits by adding money's own rate of interest to the equation. Among other variables included have been the change in the number of bank branches per head of population, the ratio of currency to total money stock and of non-bank to bank financial assets and past peak levels of interest rates. Such attempts

to adjust equations to reflect institutional change have often not produced satisfactory results. However, this may reflect the difficulty of capturing in equations the many ways in which institutional change may influence agents' actions rather than indicating that financial innovation has not been the principal cause of the apparent instability. A particular problem is that, to the extent that they are induced rather than autonomous, the factors causing financial innovations may be taken into account elsewhere in the equation. Econometricians have largely sought to use cointegration techniques to identify long-run stability amidst the short-run fluctuations.

Thirdly, blame was placed upon the assumption of equilibrium and new approaches to disequilibrium were developed. Associated with these was the development of the **buffer stock** approach to the demand for money – a formalization of the old idea that the existence of money allows the separation in time of sales and purchases (the store of value function of money). A distinction is drawn between 'demanding' money as a means of payment and being willing to 'accept' it temporarily because of the costs associated with adjusting stocks of less liquid assets. This work has built upon the precautionary demand for money models discussed earlier which see individuals as being willing to allow their money holdings to fluctuate between a floor and a ceiling.

In short, economists responded to the apparent instability in the demand for money in the 1970s and 1980s with a great deal of imagination. Many journal articles claimed support for reasons why the demand for money function was truly stable. Nonetheless, some economists saw the problems with the function as evidence for the proposition that such a function either could not sensibly be defined at all or was bound to be unstable. One view of this kind derives from the endogenous money hypothesis. This holds that in order to carry out spending plans, agents obtain bank loans. The act of spending these loans creates money in the form of additional bank deposits. As long as banks freely meet the demand for loans, the supply of money can be seen to be adjusting to the demand for them. Spending plans drive the whole process. Since investment plans, in particular, are influenced by waves of optimism and pessimism there is no reason to believe that the demand for money will be stably related to real income. In its extreme form, the endogenous money hypothesis holds that there is no demand for money function independent of the supply of money.

People are willing to hold whatever money is created through the banking system.

### 13.5 The implications for monetary policy

In summary, there is some evidence of stability in the long-run demand for money relationship but short-run adjustment lags are variable, making it difficult to estimate a stable short-run demand for money function for targeted variables. Even if the long-run function were stable, central banks would not know the lags between changes in the money stock, prices and real income. Further, where they use interest rates as the instrument of monetary policy, as most central banks do, structural lags between money stock changes and variations in final objectives may make the money stock of little value as an **intermediate objective**.

Several alternatives have been advanced. Some academics have supported a commitment to a nominal GNP target on the part of the monetary authorities. This assumes a close long-run relationship between nominal GNP and the rate of inflation. There has also been academic support for the targeting of the exchange rate, a policy followed to a large extent by members of the European Monetary System through the exchange rate link to the Deutschmark until the establishment of the euro in 1999. Many central banks have now abandoned intermediate goals altogether, targeting the rate of inflation directly. There are two main objections to the use of the inflation rate as a final objective without using an intermediate objective. The first is that the rate of inflation may be influenced, especially in the short run, by many variables including some that are outside the control of the monetary authorities. The second is the long time lag that exists between adjustment to short-term interest rates by the monetary authorities and changes in the rate of inflation.

The UK has adopted various strategies since 1976. Between 1976 and 1985, it treated the money stock as an intermediate target. Following the failure of this approach, it established an exchange rate target, firstly unofficially by shadowing the Deutschmark and then officially during the UK's brief membership of the Exchange Rate Mechanism of the European Monetary System between 1990 and 1992. Thereafter, the UK moved to a system of inflation targeting from the middle 1990s and this was continued when the Bank of England was made independent in 1997 and given

full control of monetary policy instruments. An inflation target of 2.5 per cent per annum was set but this has since been reduced to 2 per cent.

### 13.6 Summary

The demand for money in an economy provides an important link between monetary policy and changes in the level of nominal income and hence the rate of inflation (this link is known as the transmission mechanism of monetary policy). Thus, it is necessary to enquire into the nature of the demand for money.

Although we are interested principally in the aggregate demand for money, the normal approach is to begin by asking why individuals might choose to hold money when they could receive a higher rate of return on their wealth by holding other assets. It is clear that people hold money because they need it to carry out their expenditure plans. Those plans are likely to be strongly influenced by income and thus income will be a major determinant of the demand for money. However, other factors are also likely to influence the demand for money. The rate of interest is crucial among these since changes in the supply of money influence interest rates. If interest rates, in turn, have a strong effect on the demand for money, the supply of and demand for money in the economy are inter-related. It is possible indeed that the demand for money function is unstable, making the operation of monetary policy through changes in the money supply extremely difficult. Although theory provides a contribution to this debate, ultimately one can only arrive at an answer regarding the stability of the demand for money through empirical testing.

However, it is not possible to arrive at the economy-wide demand for money through the aggregation of household demand for money functions. Thus, empirical testing takes place only at the macroeconomic level. There are many practical difficulties associated with this testing and the results over the past 30 years have been inconclusive. The demand for money function appeared to become unstable in the 1970s and 1980s and much work has gone into trying to reverse and/or explain that conclusion. The controversy surrounding the demand for money function helps to explain why central banks no longer target the rate of growth of the money supply. Many have chosen to target the rate of inflation directly.

### Key concepts in this chapter

Transmission mechanism	Speculative demand	Interest elasticity
Medium of exchange	Intermediate objectives	Financial innovation
Transactions demand	Active money balances	Buffer stocks
Precautionary demand	Velocity of money	

### Questions and problems

- 1 Explain why the question of the stability of the demand for money is an important issue.
- 2 Why is it not possible to add up transactions, precautionary and speculative balances to obtain an overall demand for money?
- 3 Why is it not possible to add up the demand for money of individual households to obtain an aggregate demand for money for the economy?
- 4 Explain the various arguments suggesting that there is a relationship between the interest rate and the demand for money.
- 5 List the difficulties associated with the empirical testing of demand for money functions.
- 6 Discuss how useful all of the work done on the demand for money has, in fact, been. Should our response to the difficulties be: (i) Let us give up testing the demand for money now, the exercise is pointless; or (ii) We need more research into this important topic?

### Further reading

K Bain and P Howells, *Monetary Economics. Policy and its theoretical basis* (Basingstoke: Palgrave, 2003) Chs. 5, 6  
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#### Websites

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[www.statistics.gov.uk](http://www.statistics.gov.uk)

*What you will learn in this chapter:*

- That how the effects of monetary policy are divided between output and prices is a controversial issue
- The importance of the role of 'expectations' in models which try to explain whether monetary impulses can have lasting effects upon output and unemployment, only temporary effects or, generally, no effects at all
- Why, even if expectations are formed according to the 'policy impotence' model, monetary policy seems still to have some effect upon output and unemployment
- The basis for the argument that elected governments have an incentive to conduct monetary policy with an inflationary bias
- How the transfer of monetary policy to an independent central bank might eliminate this bias

## 14.1 Introduction

In Chapter 13 we saw that economists are very interested in the factors determining the demand for money. This is because if we know what determines the willingness to hold money, we can form some idea of how agents will respond if and when the quantity of money changes. The demand for money is thus essential to the **transmission mechanism** linking monetary ‘shocks’ to aggregate demand. However, monetary policy is concerned with a further question. This is: *given* that a **monetary shock** has some effect upon aggregate demand, how is the effect of that demand shock divided between prices and output?

In this chapter we shall see that views about the appropriate conduct of monetary policy have changed quite dramatically in the past 30 years with respect to both the issues we have just raised. However, since we had some extensive discussion of the transmission mechanism in the last chapter we shall concentrate here upon views about the effect of demand shocks caused by monetary disturbances. We shall see that policy has moved through four distinct phases. In chronological order they may be summarized as:

- Agreement that monetary shocks cause limited demand shocks and these demand shocks have lasting effects upon output and employment and in some circumstances the rate of inflation.
- A widespread view that monetary shocks cause considerable demand shocks but these demand shocks have only a temporary effect upon output and employment but lasting effects upon inflation.
- A controversial period in which it is argued by some that monetary shocks cause demand shocks but these demand shocks have only a temporary effect on output and employment in very limited circumstances. Otherwise, the effect falls entirely upon the rate of inflation.
- The most recent period in which, again controversially, it is argued that although monetary policy has little ability to influence anything but the rate of inflation in the long run there are incentives for governments to spring ‘monetary surprises’ to try to influence output and employment in the short run. Monetary policy thus has an inflationary bias which can be eliminated only by transferring its conduct to some agency that has no such incentives.

We shall look at each of these phases in turn and at the theory underlying them. We have named the phases after key concepts associated with each; their significance will become apparent in the discussion. Firstly, in Section 14.2 we look at the first phase, which we have labelled ‘the simple Phillips curve’. In Section 14.3 we look at the second phase where we shall see that the role of ‘expectations’ becomes crucial. In Section 14.4 we turn our attention to the most recent and controversial developments which we call the period of ‘the policy irrelevance theorem’. The final, and most controversial, phase is dominated by the arguments for ‘central bank independence’. These arguments are explored in Section 14.5 and we have followed this (in Section 14.6) with a brief look at the arrangements for the independence of the Bank of England. Section 14.7 looks at the argument that monetary policy is more effective if agents understand how the authorities make their decisions. Section 14.8 summarizes.

## 14.2 The simple Phillips curve

For 25 years after the Second World War, most governments conducted macroeconomic policy upon the basis that their instrument settings would have an effect upon aggregate demand and that changes in aggregate demand would have ‘real’ effects, that is upon output and employment, provided that there was spare capacity in the economy. Furthermore, as a general rule, it was felt that fiscal policy – changes in government spending and taxation – probably had more powerful and predictable demand effects than monetary policy. In the UK at least this view of the transmission mechanism was summed up by the Radcliffe Committee which rejected the importance of the money stock but laid greater emphasis upon the vaguely defined concept of ‘general liquidity’. As for central bank adjustments to short-term interest rates, their effect was largely symbolic. They might have some effect also upon the availability of ‘liquidity’ but this could be better achieved by direct controls on liquidity (Radcliffe, 1959).

More relevant for our purpose, however, is the belief, prevalent at the time, that changes in aggregate demand could have real effects provided that the economy was operating at less than full employment. Little thought was given to what precisely was meant by ‘full employment’ or to the question of how

unemployed resources could persist in an economy where limited resources faced insatiable wants and where markets were free to respond to relative price signals. In the early part of the period, say from 1945 to 1960, the connection between demand and employment was probably based upon a few stylized facts: unemployment was high in the 1930s when demand was low; it was non-existent during the war years when demand for everything outstripped supply; and it did seem to be the case through the 1950s that small increases in unemployment could be reversed by expansionary demand management.

After 1958, the idea that governments could effectively ‘choose’ the level of employment and output, up to some critical full employment level, enjoyed what appeared to be overwhelming *empirical* support from the work of A W Phillips (1958). The ‘Phillips curve’ plotted the relationship between the recorded level of unemployment ( $U$ ) and the rate of change of money wages ( $W$ ) (as a proxy for inflation since data was not available for the earlier years) from 1861 to 1957. Figure 14.1 shows a curve fitted to this data.

The implication seemed clear. The historical evidence suggested firstly that the economy could be run at various levels of unemployment and, consequently, output. Secondly, it suggested that varying the level of unemployment could be done without any positive inflation until the level of unemployment fell to 5.5 per cent. The third implication, and this is crucial in the light of later developments in this field, was that governments could choose to run the economy at



Figure 14.1 The simple Phillips curve

even lower levels of unemployment if they so wished, but in exchange they would have to accept some positive rate of inflation. On the evidence, they could, for example, choose point  $B$  in Figure 14.1, achieving an unemployment level of 2.5 per cent provided that they were prepared to accept the inflation rate of 2 per cent. Thus was born the idea of a *stable* trade-off between unemployment and inflation. We firstly illustrate this trade-off and then see that it raises some awkward questions.

Let us assume first of all that we can take the rate of change of money wages as a proxy for the rate of inflation. The Phillips curve then suggests that the rate of inflation is a function of the level of unemployment, which we might write:

$$\pi = b_1 \cdot 1/U \quad (14.1)$$

As unemployment falls the rate of inflation increases. The sensitivity of the relationship is determined by the coefficient  $b_1$ , the curve in Figure 14.1 becoming steeper, for example, with larger values of  $b_1$ .

Suppose now a situation where the value of  $U$  is such that  $\pi = 0$  (5.5 per cent, at point  $A$  in Figure 14.1). In this setting, markets, including the labour market, are in equilibrium. Workers receive a money wage which they recognize as having a *real* value which induces them to supply the amount of labour that produces 5.5 per cent recorded unemployment. Equally, employers are prepared to pay the current money wage, knowing its real value and knowing that, given the current level of productivity, demand for their products and so on they can earn normal profits.

Now imagine that the government introduces a demand shock, with a view to reducing the level of unemployment to 2.5 per cent, and is willing to accept 2 per cent inflation as the trade-off. As  $U$  falls, demand pressure increases. Firms produce more in response to the increased demand and hire more workers, paying them a higher money wage to induce extra work. Suppose that they are offered an increase in money wages of 2 per cent. More labour is forthcoming ( $U$  falls) because employment has become more attractive since *real wages* appear to have increased by 2 per cent. In Figure 14.1 we move up the Phillips curve from point  $A$  to point  $B$ , and all appears to be well.

However, it is commonplace in economics to assume that people are rational, utility maximizers and that they are well informed. The first two assumptions carry with them the corollary that agents respond to changes in *real* magnitudes. In our example, unemployment falls

(output expands) because workers expect to be better off in *real* terms by the increase in money wages. But if the rate of inflation (at point *B*) is now 2 per cent, then the contracts which have just been signed no longer deliver a real increase in wages of 2 per cent. In fact, once the inflation rate has fully adjusted to the new pressure of demand, there will be no change in real values at all. The negotiated 2 per cent will only be enough to keep pace with inflation. And if we hold to our assumption that rational agents are only influenced by real changes, we must now expect that workers will revise their plans to supply labour when they find that there is no real wage increase. If the planned *real* wage increase is to materialize under these new inflationary conditions, then the wage contract has to increase **nominal wages** by an amount sufficient to deliver the intended *real* change *plus* an amount sufficient to compensate for inflation. In this case, if  $\pi = 2$  per cent, a real increase of 2 per cent requires a money or nominal increase of 4 per cent. The point of this illustration is that it shows that the assumption of rational, well-informed agents leads us to expect that people take the rate of inflation into account in setting prices, since what they are concerned with is *real* values. If they do not behave in this way, then we have to imagine that they are not rational (something that economists are always reluctant to do!) or that they are not well informed enough to realize what is happening and that they mistake changes in nominal or money values for changes in real ones. This may be more plausible, and it is known as **money illusion**.

We can now see why, if agents take inflation into account, the stable trade-off between inflation and unemployment shown in the 'simple' Phillips curve in Figure 14.1 is threatened. At point *B* prices are now rising by 2 per cent per annum. The 2 per cent increase in money wages no longer gives an equivalent increase in real wages. Indeed, the real wage is unchanged. If we maintain our assumptions about rational, well-informed agents, we must expect that their behaviour will revert to that which prevailed at the old real costs and rewards. Unemployment (and output) return to their original level. All that has changed is that prices are now rising by 2 per cent per annum. Knowing this, rational agents will take 2 per cent inflation into account in setting future contracts and there is a likelihood that 2 per cent thus becomes established as the new rate of inflation. If this happens then in Figure 14.2 we are at point *C*.

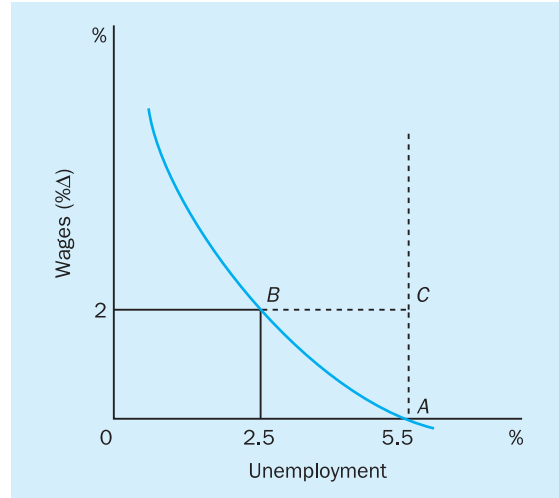


Figure 14.2 Expectations-augmented Phillips curve

### 14.3 The 'expectations-augmented' Phillips curve

In Figure 14.2, we move from point *B* to point *C* because agents come to realize what is happening to the rate of inflation. The time it takes for them to realize this and to take it into account in their behaviour obviously depends upon how they 'learn' about the rate of inflation. If they learn slowly, then point *B* might be an available option to governments for a significant period of time, the transition to *C* happening only slowly. On the other hand, if the learning takes place quickly, point *B* will be short-lived. We shall see in the next section that it might even be possible for agents to *anticipate* what is going to happen to inflation. In this case, point *B* never materializes and we go directly from *A* to *C*. If we rule out the latter case for the moment and accept that learning takes time, then what we saw at the end of the last section leads us to the conclusion that the Phillips curve may be downward sloping in the short run but that in the long run it is vertical. The length of the short run depends upon how quickly people learn what is happening to the price level and upon how quickly contracts can be revised.

What we have described as 'learning' is usually described in the monetary policy literature as **expectations formation**. The idea that expectations should play an important role in economic and financial decision making is no surprise to us. In Section 8.2,



for example, we noted that decisions to buy assets must be based on the return people *expect* and yet the only firm information that they have concerns past returns. In Section 9.3.1, we drew a distinction between the nominal and real rate of interest, a distinction which depended upon the *expected* rate of inflation. In Section 9.3.2 we saw that Keynes thought the demand for money (and thus the current rate of interest) depended upon how agents thought interest rates were going to change. In Section 10.4 we were interested in agents' expectations of the behaviour of *future* short-term interest rates and listed factors – expected inflation, the rate of credit expansion, the level of government borrowing – that might influence these expectations. In Section 11.5 we saw that asset prices might be affected by what agents thought would happen to asset prices in future. Notice, however, that although we have frequently stressed the importance of expectations and we have sometimes listed factors which seem relevant to a particular set of expectations, we have said nothing about the manner in which that information is used in order to *form* expectations.

There are essentially three approaches which economists take to 'expectations'. The first is to treat expectations as exogenous. This means that expectations are formed by influences largely outside the economic system. This would be legitimate if we felt that the state of expectation depended upon such 'psychological' factors that no amount of studying human behaviour could ever lead us to general conclusions about a connection between 'economic' events and expectations. This is a position that Keynes sometimes took, in talking about the 'animal spirits' of entrepreneurs, for example. At other times, however, he often wrote as though uncertainty about the future caused agents to rely very heavily upon past experience or 'convention' as he often called it.

The idea that past experience should play a large part in forming people's expectations seems eminently reasonable and forms the basis of a second approach to expectations formation known as **adaptive** or **backward-looking expectations**. In this case, people expect events to continue as they did in the past, where the recent past is more important than the distant past. We might, for example, expect inflation next year to be equal to some weighted average of the past five years, where the weight given to this year's rate is quite large, with the weights given to earlier years declining quite sharply.

Yet another idea suggests that agents form their expectations taking past experience into account but doing so in a way that enables them to construct a 'model' of the economy. This model then gives them some guidance about the likely *future* effect of *current* events. In a sense, therefore, such expectations are **forward looking** but are more frequently called **rational expectations** because this is the way in which we would expect rational economic agents to form expectations. Rational agents should make the best use of all available information and not just the past behaviour of the variable in which they are interested. The theory of rational expectations has had a major impact in economics and finance in recent years. We shall meet it again in Chapter 18, when we look at foreign exchange markets. It is also a major theme of Chapter 26 where we discuss the 'efficiency' of financial markets.

For the moment, we need to understand that the possibility of a Phillips curve-type unemployment–inflation trade-off depends upon the speed with which people learn about what is happening to inflation; and the speed of this learning depends upon how expectations are formed. It is easy to see why the trade-off should depend upon speed of learning. Assume that learning takes some time so that the transition from *B* to *C* is slow. This is because agents failed to take the *future* rate of inflation into account accurately and quickly. If, in our example, workers had *known* that inflation was going to be 2 per cent, they would have asked for 4 per cent. If employers had refused, then workers would not have accepted more employment. We would have gone directly from *A* to *C*. The simple Phillips curve disregarded expectations and thus created the impression of a *stable* trade-off between unemployment and inflation. In the next section we shall examine an argument that correct expectations are formed so quickly that there is *never* a trade-off. In this section we look briefly at an intermediate position which shows more precisely what is necessary for monetary shocks to have at least a short-run effect on employment and output.

The simple Phillips curve of Section 14.2 takes no account of expectations. This is clear in Equation 14.1 where the rate of inflation depends solely upon demand pressure, captured by the term  $1/U$ . This is easily modified to incorporate a role for expectations.

$$\pi_t = b_1 \cdot 1/U_t + b_2 \cdot \pi_t^e \quad (14.2)$$

(We add the time subscripts,  $t$ , since time is about to become critical.) Current period inflation now depends

upon the *current* level of demand pressure (as before) but also upon current expectations of inflation. The term  $b_2$  captures the extent to which inflation expectations, howsoever they are formed, are incorporated into current price-setting behaviour and thus into the rate of inflation. If  $b_2 = 0$ , then we have the simple Phillips curve case where expectations play no part.  $b_2 = 0$  therefore indicates total money illusion, while  $b_2 = 1$  indicates complete absence of money illusion. We shall assume that  $b_2 = 1$ , unless otherwise stated. Notice that this does *not* mean that the inflation rate is correctly and instantly anticipated. It only means that whatever expectations people have are fully incorporated. As we shall see in a moment, the expectations themselves could be persistently wrong.

The question then is how are inflation expectations formed? The early attacks upon the simple Phillips curve used the assumption that *current expectations* of inflation are based upon *past actual* rates (Friedman, 1968). Current expectations are a weighted average of past actual rates, with the weight on each past rate declining as it becomes more remote. In the terms of our discussion above, these criticisms were based upon an adaptive or backward-looking approach to expectations. The significance of backward-looking expectations formation can be illustrated if we simply assume that expectations are based solely on the most recent past period. If this is the case, then:

$$\pi_t^e = \pi_{t-1} \tag{14.3}$$

Substituting into Equation 14.2 we then have the rate of inflation given by:

$$\pi_t = b_1 \cdot 1/U_t + b_2 \pi_{t-1} \tag{14.4}$$

Current inflation is thus the outcome of current demand pressure plus last period's inflation rate. There are two very important implications of Equation 14.4.

The first implication is that monetary policy can only influence the inflation rate if it succeeds in changing demand pressure and thus the level of output and employment. To see this, assume that unemployment takes a value such that  $b_1 \cdot 1/U_t = 0$ . Current inflation will equal last period's inflation. Current inflation can *change* only if demand pressure, and  $U$ , change. In the short run at least the Phillips curve must have a negative slope and monetary policy has at least a short-run effect upon the real economy.

The second implication is that if demand pressure is such that  $b_1 \cdot 1/U_t > 0$ , then maintaining that level

**Exercise 14.1 Adaptive expectations and the rate of inflation**

Suppose that the current rate of inflation is determined as specified in Equation 14.3. Calculate the rate of inflation:

- (a) this year
- (b) next year
- (c) in two year's time

if  $b_1 = 0.1$ ,  $b_2 = 1.0$ ,  $U_t = 5\%$  ( $= 0.05$ ), last year's inflation rate was 2%. Assume that unemployment is unchanged throughout the three-year period.

of pressure must result in *accelerating* inflation. This is just a formal presentation of the criticism of the simple Phillips curve that we saw at the end of the last section. If the government persists with an attempt to maintain unemployment at a level that creates inflationary pressure, the short-run Phillips curve will shift *continuously* upward. Exercise 14.1 provides a numerical illustration.

If there are levels of  $U$  such that  $b_1 \cdot 1/U_t > 0$  and inflation *accelerates*, there must be some value of  $U$  at which  $b_1 \cdot 1/U_t = 0$ . At this level of  $U$ , there is no demand pressure, and inflation is constant. (Inflation in each period is equal to that of the previous one.) This level of unemployment is known variously as the *non-accelerating inflation rate of unemployment* (happily shortened to *NAIRU*) or the **natural rate of unemployment**, 'natural' because this is the level of unemployment that the economy will settle at if governments do not attempt to raise aggregate demand to inflationary levels. In a sense, therefore, this 'natural rate' might be regarded as 'full employment', though it need not, of course, correspond to a situation where the recorded level of unemployment equals zero. When demand pressure begins to cause inflation there will still be positive unemployment made up of people moving between jobs or lacking the necessary skills or being in the wrong place. And if the official unemployment count depends upon the number of people claiming welfare benefits, as it does in the UK, then changes in the rules governing eligibility for those benefits will cause changes in the recorded number of unemployed associated with zero inflation. The 'natural rate' will certainly be positive and is unlikely to be a constant number.

### 14.4 The policy irrelevance theorem

If expectations are backward-looking or adaptive, monetary policy will still affect output and employment in the short run, but in the long run, when eventually expectations catch up with reality, it can only affect the rate of inflation. However, while it may be perfectly sensible to suggest that people form their expectations on the basis of the recent past, it may be too simple to suggest that this is the only source of information they use.

Let us suppose that knowledge of the past enables agents to build up an accurate picture about how the economy works. Suppose, moreover, that their ‘model’ is one in which changes in the rate of monetary expansion cause changes in the rate of inflation after a period of time.<sup>1</sup> If they know this, then their expectations of future inflation will be based upon the government’s current monetary policy. Expected inflation is no longer equal to past inflation, but is a function of what people believe current policy will produce. If this is the case, and assuming that agents are working with a quantity theory model, the second (expectations) term in Equation 14.4 needs to be modified to one that features the current rate of monetary growth,  $\dot{M}_t$ , relative to the natural rate of growth of output,  $\dot{Y}^*$ .

$$\pi_t = b_1 \cdot 1/U_t + b_2 \cdot (\dot{M}_t - \dot{Y}_t^*) \quad (14.5)$$

Notice that in making this modification we have made expectations *forward-looking*. What people expect inflation to be is based upon what they think the effects of current policy *will be*.

In the terms that we used above, agents are now forming *rational expectations*, ‘rational’ because agents, acting in their own self-interest, are making the best use of all available information in making any judgement. Failure to do this will result in them making mistakes (see Chapter 26),<sup>2</sup> and if they make mistakes that they could avoid, then either they are not acting rationally or they are not concerned to

maximize their own welfare. Neither of these possibilities is allowed in orthodox economics.

The suggestion that agents form their expectations ‘rationally’ is credited initially to Muth (1961) though the best known application of it in an economic policy context was by Lucas (1973). Since then, the ‘rational expectations hypothesis’ (REH) has played a large part in the development of macroeconomics and has come to be associated with what is known as the ‘New Classical Macroeconomics’, so-called because it combines the rational expectations proposition with the assumption of market-clearing in order to produce much the same predictions about the macroeconomy that ‘Classical’ (pre-Keynesian) economists produced.

At this juncture we need only appreciate the crucial point that in saying that people do not make avoidable errors in forecasting inflation, the REH is saying that agents, on balance, make correct forecasts. We can see why, if we consider the ways in which the forecast can differ from the actual outturn. In Equation 14.6  $\pi_t^e$  is the expectation of next period’s inflation formed in period  $t$ .  $\pi_{t+1}$  is the rate of inflation that actually materializes in the next period,  $t + 1$ , while  $\mu$  is an error term. Thus:

$$\pi_{t+1} = \pi_t^e + \mu_{t+1} \quad (14.6)$$

It is central to the REH that in a series of repeated forecasts the error term,  $\mu$ , should have a mean of zero and be uncorrelated with previous values of itself and uncorrelated with the actual inflation rate. These conditions ensure that there is no information contained in  $\mu$  that could be used to improve future forecasts. For example, if the mean value of  $\mu$  were not 0, we would have forecasts that consistently over- (or under-) forecast the outturn. Future forecasts could be improved by making an appropriate allowance. Equally, correlations between the error term and earlier errors, or actual outturns, would suggest a pattern in the forecast errors which we could uncover and use to improve future forecasts.

Returning to the Phillips curve, we can see that the implications of the REH approach are quite startling.

<sup>1</sup> This amounts to saying that they have a ‘quantity theory’ view of the world. Velocity is stable, so that there is a reliable connection between money and spending. Meanwhile, output can grow only at its ‘natural rate’.

<sup>2</sup> In Chapter 26 we revert to the practice of using  $\wedge$  over a variable to indicate an expected value. That is common practice in many finance texts; unfortunately, the same convention does not apply to economics texts where it is more usual to denote an expected value with the superscript  $e$ . We have used both because we think it will help students who may be reading our exposition of a particular issue simultaneously with treatments in other books. We hope that trying to be consistent with other texts is more helpful than being consistent through all of our chapters. Readers who do find our practice confusing should keep one finger in the glossary where we make the meaning of each  $e$  and  $\wedge$  variable clear.

We noted in the last section that it was the speed with which agents realized what was happening to inflation that determined how long it took the economy to move through the sequence  $A-B-C$  (in Figure 14.2) and thus determined for how long monetary shocks could have any effect upon output and employment. If it is correct, the REH approach is saying that, when agents notice a monetary shock is taking place, their expectations of inflation will adjust *immediately*. We go straight from  $A$  to  $C$  and monetary policy is impotent as regards ‘real’ variables. Exercise 14.2 illustrates the different responses we should expect between agents who form expectations adaptively (as in the last section) and those who form them according to the REH.

Notice, though, that this does not mean that monetary policy *never* has any real effects. We used the phrase ‘when agents notice a monetary shock is taking place . . .’. Clearly they cannot incorporate a monetary expansion into their model in order to make the correct inflation prediction if they do not know it is happening or for some reason cannot recognize it for what it is. Monetary ‘surprises’, therefore, can have short-term real effects, but we need always to remember that agents can learn also about surprises. A government is unlikely to introduce a surprise without reason (to win an election, perhaps). Once that reason becomes understood, a surprise is no longer possible and policy will be impotent once again.

The suggestion that monetary policy is completely irrelevant to real variables unless it is carried out in such a way as to ‘surprise’ well-informed agents was bound to be controversial. Moreover, it also appeared to be a testable hypothesis and these two characteristics ensured what Goodhart (1989, Ch. 13) described as a ‘cottage industry’ of testing. He reports 63 tests of the impotence hypothesis for seven different countries. Only 17 of these appeared to confirm the hypothesis that only unanticipated monetary shocks had real effects. The majority suggested that monetary policy had real effects whether it was anticipated or not.<sup>3</sup>

Although monetary policy impotence is a large claim, it may be less striking than one of the *implications* of the hypothesis. This is that the persistent and major deviations of real variables – output, employment, capital formation and so on – from trend, which we have

#### Exercise 14.2 Adaptive and rational explanations

Imagine that the rate of inflation was 2 per cent last year while the rate of growth of output has been running at about 3 per cent for the past few years. Suppose also that the government announces a target rate of monetary expansion for the next year of 7 per cent with the aim of expanding demand and lowering the level of unemployment.

- 1 What would be your best forecast of the rate of inflation over the next year if you formed your expectations adaptively?
- 2 What would your forecast be if you formed them in a forward-looking manner?
- 3 In the circumstances described, how would you react to the offer of a 4 per cent increase in money wages if you formed your expectations adaptively?
- 4 How would you react if your expectations were forward-looking?

seen in recent years, is due to people being ‘surprised’ by movements in the general level of prices. To appreciate this implication we return to Equation 14.2. Since variations in the level of unemployment occur with divergences in actual output ( $Y_t$ ) from equilibrium output, ( $Y_t^*$ ), we can rewrite Equation 14.2 as:

$$\pi_t = b_1 \cdot (Y_t - Y_t^*) + b_2 \cdot \pi_t^e \quad (14.7)$$

Continuing with the assumption of no money illusion, ( $b_2 = 1$ ), then:

$$b_1 \cdot (Y_t - Y_t^*) = \pi_t - \pi_t^e \quad \text{and}$$

$$Y_t - Y_t^* = 1/b_1(\pi_t - \pi_t^e) \quad (14.8)$$

The difference between actual and equilibrium output is a function of the difference between expected and actual inflation, the forecasting error. But under rational expectations we know that the forecasting error should be purely stochastic with mean zero and no auto-correlation. However, the UK, like the USA and most European economies, has experienced major booms and recessions over the years. During the 1950s, the pattern was referred to as ‘stop-go’ and was

<sup>3</sup> A problem with all tests of hypotheses about expectations-determined events is that rejections are hard to interpret. They may indicate a rejection of the genuine hypothesis (‘expectations *do not* play the expected role’) or they may indicate that expectations are actually crucial, but are usually wrong. The problem is that any such test is a simultaneous test of joint hypotheses.

certainly thought of at the time as being associated with demand management policies. More recently, in 1980–83 and again in 1990–93 the UK experienced two periods of major recession when output was below potential. In 1987–89 output was above potential. On this evidence therefore, if we persist with an REH-type analysis, we have to say that agents make frequent and large forecasting errors. They seem not to be well informed about movements in the price level. Furthermore, since the deviations persist (and often have the appearance of cyclical behaviour) the forecast errors show incontrovertible signs of autocorrelation.

Given both the quantity and quality of information that is available about current changes and likely future movements in the price level, it is difficult to believe that agents make frequent, large and persistent (that is, autocorrelated) errors in the way the theory suggests. Price level data and leading indicator data is available monthly. It is amongst the more reliable information that is regularly published. It is also reported in a high-profile way. Furthermore, anyone lacking the necessary information to make a judgement can obtain it quickly and very cheaply. At the same time, we know (from Section 9.4) that central banks certainly act as though changes in interest rates have effects upon real variables and we know that (with one exception) fluctuations in the UK economy since the 1950s have been associated with macroeconomic policy responses to pressure on the exchange rate.<sup>4</sup> Policy does seem to have real effects and yet it is hard to believe that people are not well-informed.

If it seems unlikely that mistaken assessments about the general price level are responsible for monetary policy's impact on real variables, what is the explanation? The possible answers are many and varied and most go (again) beyond the scope of this book. But one issue worthy of careful attention is the nature of markets, *in practice*. Much economic theory works on the assumption that market prices are perfectly (that is, continuously) flexible. It is assumed that they work *as if* prices were being continuously adjusted by a mythical auctioneer who gathers all bids so that no trades take place at disequilibrium prices. Consequently, markets always clear. The appeal of this assumption lies, like the REH itself, with the idea that economic agents are fundamentally rational, self-

interested individuals and that trading at disequilibrium prices, prices that generate quantities that agents do not want, is inconsistent with such rationality.

But this overlooks a reality which is that such flexibility is conspicuous by its rarity. Later in this book, we shall see that it is a characteristic of only a subset even of financial markets. In dealer or 'quote-driven' markets, for example, dealers quote a two-way price *for a period of time* until sufficient information has accumulated, through inventory changes, to suggest that a change is essential. Many markets for goods and services exist where adjustments take the form of quantities in the first instance. Labour markets are both quantity and price inflexible over long periods. The reasons for these inflexibilities are many and are increasingly well understood. They have to do primarily with costs, information and uncertainty. It takes time to adjust prices, and price adjustments involve real resources. At the least, there is no reason to assume that traders will adjust prices until the cost of sticking with a misaligned price exceeds the cost of changing it. In the presence of uncertainty (about the permanence of an apparent demand shift, for example) and incomplete information (about the quality of goods and services from rival traders, for example) a rational, self-interested response may be to continue as before until the picture clarifies.

... in the real world many markets do *not* clear perfectly and instantaneously, even though market agents behave rationally and efficiently with regards to the formation of expectations under conditions of imperfect and costly acquisition of information. In short, an assumption of rational, efficient market agents does not also validate an assumption of perfectly clearing markets.

(Goodhart, 1989, p. 23)

Consider now the implications of having *some* **fix-price** firms in an economy. We begin at the end of a week's trading, in full equilibrium, where everyone knew the pattern of relative prices as well as the general price level: expectations were fulfilled. Expectations are then formed about next week's trading. Now let us introduce a monetary expansion. Initially, there is an excess of real balances and an increase in spending. Recognizing this monetary shock, **flex-price** firms raise their prices immediately. The increase in spending is

<sup>4</sup> The exception is the 1973–76 'oil shock', though even here part of the recession may be attributed to policy responses to the oil price rise.

partially damped as real balances are reduced by the price rises and, additionally, the pattern of demand is switched toward the fix-price producers. So long as there are some fix-price producers, however, the adjustment in the general price level must be incomplete and some increase in real balances (and expenditure) must remain. Output and employment in fix-price firms, and in the economy as a whole, increase. The monetary expansion has real effects.<sup>5</sup>

### 14.5 The transmission mechanism of monetary policy

‘Monetary shocks’ affect both output and the general price level, as we have just seen, and central banks are keenly aware of this. In this section, we look at the mechanisms, or chain of events, which link a change in monetary policy with changes in prices and output. This chain, the ‘transmission mechanism of monetary policy’, varies in detail between different economies because it depends partly upon institutional structures. However, these differences are small and involve the relative importance of different channels rather than the existence of the channels themselves. The explanation which follows is based largely upon current thinking in the Bank of England. This is unlikely to differ fundamentally from views of the transmission mechanism in other countries (see, for example, Chart 3.1 in ECB, 2004).

The starting point is the operating instrument. In spite of the fact that some textbooks still give the impression that central banks can cause exogenous changes in the *quantity* of money, in practice central banks employ their monopoly powers as lenders of last resort to vary the *price*. This ‘price’ is some short-term interest rate. In Section 15.4 we explain how exactly central banks do this. For example, the Bank of England and the ECB set the price of very short-dated gilt repos, but a notable feature of recent developments in central bank operating procedures is the tendency towards convergence. There is little difference wherever we look (Borio, 1997). A mixture of convention and arbitrage then communicate any change in this ‘official’ rate to other short-term money market rates, more or less instantly. The impact upon

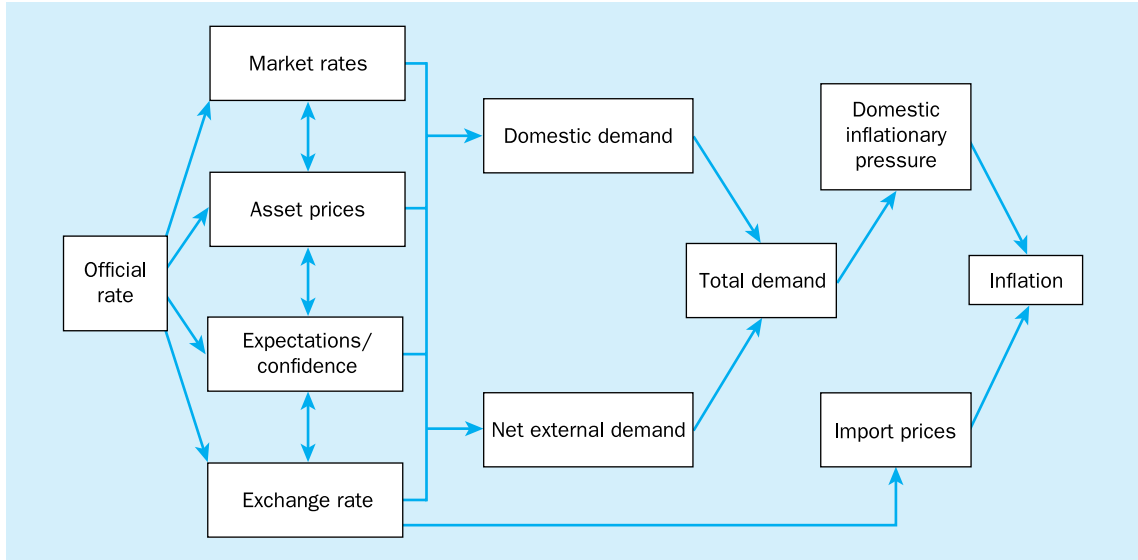
longer-term rates is rather less direct and less certain, though there is a tendency for all rates to move in the same direction.

This change in interest rates has an impact upon output and prices primarily because it has an impact upon demand. We say ‘primarily’ because there is a secondary channel for some economies, especially ‘open’ economies which engage in high levels of foreign trade. This secondary effect comes through changes in the exchange rate. A rise in interest rates, *ceteris paribus*, will normally cause a rise in the foreign exchange value of a country’s currency. This makes imports cheaper and so there is a negative effect upon the price level (or inflation) which is *independent of and additional to any effect on demand*. However, the main impact falls upon demand, and Figure 14.3, borrowed from the Bank of England, shows how this happens. In our explanation, we trace the effects of a rise in the official rate, but this could easily be rewritten for a cut.

There are four channels of influence and all four affect both domestic demand and external demand which then affect output and prices.

The first channel involves market interest rates. An increase in short-term rates increases the cost of most short-term borrowing since this is typically undertaken at variable rates in the UK. This makes new borrowing less attractive and some expenditure decisions will be postponed. It also has an effect on existing borrowers by redistributing income. A rise in rates means that existing borrowers have to pay more to lenders. Evidence suggests that these increased payments to lenders are largely saved with the result that this redistribution of income leads to a reduction in spending. Furthermore, a rise in interest rates pushes up the cost of consuming now as against consuming in the future. This should encourage saving. What happens to long-term rates is less certain. If they move in the same direction, then capital spending will also be cut back. This may not happen, however. It is possible for markets to interpret a rise in official (and short-term) rates today as indicating lower inflation in future. If that happens, it is likely to mean lower short-term interest rates in future when inflation is lower and, since *expected* future short rates are a major influence on *current* long rates (see Section 16.5), it is possible for an increase in short rates to be accompanied by a fall in long rates.

<sup>5</sup> This passage draws heavily upon Laidler (1988).



**Figure 14.3** The transmission mechanism of monetary policy

Source: *Bank of England Quarterly Bulletin*, May 1999.

The second channel involves asset prices. As we saw in Section 11.3, a change in market interest rates must cause a change in the rate of return required from all assets. Since the required return is also the rate at which we discount the future cashflow generated by assets, the market value of the assets must fall. This will happen most directly in the case of short- and medium-dated assets. The effect is less certain for long-dated assets since the effect upon long-term interest rates is uncertain for the reasons we have just seen. However, if long rates rise, then long-dated asset values will also fall and this fall is likely to be greater for any unit change in interest rates than is the fall in short-dated asset prices, for reasons of ‘duration’ (see Section 16.4).

A change in interest rates also affects expectations. We saw this a moment ago in connection with inflation expectations and long-term interest rates. But interest changes can cause changes in other expectations. A rise in rates might be interpreted as a signal that the economy is growing more quickly than thought, leading to expectations of higher output, income and profits. This might then lead to higher investment and increased demand for capital goods. On the other hand, an increase in rates might be seen as part of a counter-inflationary policy, encouraging the view that output will grow more slowly in future. Of all the channels, this is the most uncertain in its effect and explains

why central banks now place so much emphasis on the ‘transparency’ and ‘credibility’ of policy. The idea is that if policy makers are completely open about how they arrive at decisions about interest rates, people will learn the ‘correct’ interpretation of a change and will respond in a consistent way.

Finally, a change in interest rates affects the external value of a country’s currency. A rise in interest rates normally causes its value to rise relative to that of other currencies and this in turn makes imports cheaper and exports dearer. We have already commented that the cheapening of imports will itself put downward pressure on prices, regardless of any demand effects. But there will also be demand effects. Firstly, the cheapening of imports reduces domestic demand in so far as people switch to buying imported goods and buy fewer of those made at home. At the same time, there is also a fall in external demand, since exported goods are now more expensive for overseas buyers.

All of these changes, taken together, mean a reduction in the demand for goods and services and makes the official interest rate look like a powerful policy instrument. It is important to remember the limitations, therefore. Firstly, the ‘psychological’ impact of interest changes is ambiguous as regards direction and uncertain in magnitude. Furthermore, there are time lags between a change in the official rate and changes in spending. Even worse, these lags may be variable. Finally,

the effect of the change in demand itself – whether it falls largely upon quantities or prices – depends on the issues we discussed in the previous section.

However, while it is obviously helpful to central banks to know that a rise in interest rates will reduce inflationary pressure and also to know *why* that is the case, it does not tell policy makers by *how much* they should raise the rate in given circumstances (or by how much they should lower it in others). The Bank of England is guided in this decision by econometric evidence of the past responsiveness of key variables to changes in interest rates. The Monetary Policy Committee then either bases its decision directly upon these quantified relationships or, more frequently, it uses these relationships as a starting point and makes a decision based in part on its *judgement* about how events are likely to unfold (Budd, 1998; Bean, 2001). The point is that the MPC has considerable *discretion* in making its interest rate decision. Much the same applies in the USA where the Federal Open Markets Committee makes the judgement and in the ECB where the decision rests with the Governing Council (ECB, 2004, p. 10). The very fact that the decision is made by committee is an indication that judgement and discretion are involved.

How much easier it would be if only the decision could be made by reference to some simple rule. Furthermore, a rule would have the advantage that it would actually constrain the decision makers which might, in some circumstances, be desirable. In the next section we shall see that strong arguments have developed in recent years for placing the conduct of monetary policy in the hands of a central bank which is independent of government and of the political pressures to which governments are exposed. Some of these advantages might be available if the policy makers were obliged to follow a rule. Certainly a rule would constrain the behaviour of policy makers. The rule could be published and the policy makers' decisions could be monitored to ensure that they stuck to the rule. The history of 'rules versus discretion' in monetary policy goes back a long way. We need only to look at recent developments.

Before we do that, however, we need to be clear on what is meant by a 'rule' in this context. For our purposes, a **monetary policy rule** is a formula which tells us how to set the policy instrument (or instruments) in a given set of circumstances. On this definition, a monetary policy rule must tell us how to set either the growth rate of money or the level of short-term

interest rates. One of the earliest examples of such a rule was Friedman's (1968) suggestion that policy should be designed to deliver a rate of growth of the money supply which should approximate the long-run growth of real output. If velocity was rising (falling) then the growth rate might have to be modified so that it exceeded (was less than) the growth of output, but the idea was to produce a growth in the quantity of money which would be just sufficient to buy the growing level of output. If this could be achieved, there would be no inflationary or deflationary pressure. Moreover, the rule would be simple enough for everyone to understand. Hence, the authorities' behaviour could be easily checked against the rule and provided they were satisfied that the authorities were behaving correctly agents could make their decisions confident about the future rate of inflation. A more recent version of a rule with the money stock as the policy instrument was formulated by McCallum (1989). This provides a formula for setting the growth rate of narrow money ( $M_0$ ) in the light of changes in velocity (the demand for money) and the deviation of nominal income from its target level.

As we all know, however, the chosen instrument of monetary policy is the rate of interest rather than the money stock. For this reason, the best known rule in recent years was that devised by John Taylor (1993) to guide central banks in setting interest rates. Essentially, the rule requires decision makers to focus upon the current rate of inflation and the 'output gap'. The latter refers to the extent to which the current level of output falls short of the economy's capacity to produce. Formally, the rule is written as:

$$i = \pi + 2.0 + 0.5(\pi - 2.0) - 0.5(y^* - y) \quad (14.9)$$

where  $i$  is the nominal rate of interest (set by the central bank),  $\pi$  is the rate of inflation and  $(y^* - y)$  is a measure of the output gap – the extent to which output falls short of its potential. It should be read in three parts. Firstly, it sets the real rate of interest at 2 per cent ( $\pi + 2$ ) provided (next) that inflation is 2 per cent and (thirdly) that output is at its potential. Notice that the middle term is, in effect, setting an inflation target of 2 per cent. This is because the rule says that for every 1 per cent that inflation exceeds 2 per cent, the real rate should be raised by 0.5 per cent. However, for every 1 per cent by which output is running below its full capacity level, the real rate should be 0.5 per cent lower. The underlying logic of the rule obviously follows the analysis of Section 14.3. The future



**Exercise 14.3 Using the Taylor rule**

Given the version of the Taylor rule in Equation 14.9:

- (a) calculate the rate of interest that the central bank should set if the rate of inflation is currently 5 per cent, the inflation target is 2 per cent and output is estimated to be two percentage points below capacity;
- (b) if this succeeds in bringing inflation down to 4 per cent next year, what rate should the central bank set, assuming other conditions are unchanged?

rate of inflation (at which the nominal rate is aimed) is strongly influenced by the current rate (the first part of Equation 14.9) and the pressure of aggregate demand (the third part). The middle part of Equation 14.9 sets the rate of inflation that we are prepared to accept.

Central banks do not generally admit to setting interest rates in this way, but the increasing openness of monetary policy making of recent years, which we look at shortly, means that we can see that the current rate of inflation and its forecast trend, together with the state of demand, are major inputs into the decision-making process. Furthermore, most central banks have accepted that targeting the inflation rate directly is preferable to targeting some intermediate variable (money stock, exchange rate) which might itself deliver the desired rate of inflation. In the UK, the target rate adopted in 1992 was 2.5 per cent per annum as measured by the retail prices index. This was amended in January 2004 to 2 per cent, measured by the annual change in a new ‘consumer price index’. The ECB’s target is a rate of inflation less than 2 per cent as measured by the ‘harmonized index of consumer prices’ – effectively the same measure as now used in the UK. The Federal Reserve does not publish an explicit target but appears to be content with inflation rates of less than 2 per cent. This target is represented by the middle part of the expression in Equation 14.9.

#### 14.6 Governments, inflationary incentives and independent central banks

We are familiar by now with the fact that monetary policy is conducted by central banks. This is because

policy in practice involves setting interest rates and this has to be done by some agency which is powerful enough to impose its will on the markets in which these interest rates are set. This falls inevitably to the central bank because of its monopoly powers in supplying liquidity to the banking system (see Section 9.4). Hence central banks are inevitably involved in the conduct of monetary policy. However, it is one thing to say that central banks implement interest changes and another to say that they decide what those interest rates should be. In the past many central banks acted as agents for their governments (specifically the Ministry of Finance or the Treasury) and implemented the rate of interest dictated by the government. In recent years, however, a strong consensus has emerged that monetary policy is more effective if carried out by a central bank which is independent of government. ‘Independence’ means that it is free to decide on the rate of interest necessary to deliver the inflation target (‘operational independence’) or that it is free to set *both* the target and the instrument (‘full independence’). The Bank of England is an example of the former case; the ECB and the Federal Reserve are cases of the latter. This movement towards removing government from the decision-making process obviously shares some common features with the arguments in favour of the ‘rules’ approach to monetary policy that we looked at above. Both reduce the scope for political judgement in the setting of interest rates. In this section we look at where this desire to restrict the role of government has come from.

All of these reasons start from the position that governments, and the politicians who comprise them, act (as market agents are assumed to do) entirely from self-interest. Two possible directions may be taken from here. Firstly, the government may be considered as a unit that seeks to gain advantage for itself at the expense of the citizens of its own country. One way in which it can gain is by creating inflationary surprises. This can occur because any expansion of the money supply provides a once-and-for-all gain for the issuer of money equal to the difference between the face value of the money and its cost of production. This gain (known as *seigniorage*) may take a number of forms. For example, by inducing an inflation the government succeeds in reducing the real value of the national debt. In effect, an expansionary monetary policy acts as a tax on the savings of the citizens. If we follow through the logic of the expectations-augmented Phillips curve discussed above, we see that each time the government

seeks to create an inflationary surprise it succeeds only in ratcheting up the rate of inflation in the economy while achieving no long-run increases in employment or output. This suggests that as long as the costs of higher inflation rates for an economy are greater than any short-term gains associated with higher employment or output, monetary policy should always be designed to keep inflation low. In the strong version of the theory which proposes that monetary policy has no impact on real variables *even in the short run*, the argument for tight monetary policy appears to be irrefutable.

The problem with this argument is that it is difficult to see why governments should act to gain at the expense of their citizens. One obvious approach to this is to see governments as sets of individual politicians who are seeking only to retain power. They thus choose those policies which they believe will ensure their re-election (they seek to maximize votes). Thus, they have an incentive to increase government expenditure in order to win the votes of electors wishing for greater spending on health, education, defence or other government programmes. However, a fear that increased tax rates and higher interest rates might lose votes provides the government with an incentive to run large budget deficits financed by increases in the money supply. This would be particularly effective politically if voters suffered from money illusion and believed that the monetary expansion would cause unemployment to fall. Of course, in line with the theory outlined above, this could, at best, only work in the short run – but it might be sufficient to win the ensuing election.

After the election, unemployment would again rise and the economy would be burdened by a higher rate of inflation. To reduce this inflation, the government might then have to cut demand sharply, inducing a recession with further increases in unemployment. This would make the government very unpopular between elections but could put it in a position to expand the economy again in time to win the next election. Such a process is referred to as the political business (or electoral) cycle – an unnecessary cycle with real costs for the economy which is generated by the need for governments to face elections. This would not lead to ever-increasing inflation but would involve real costs for the economy as inflation would fall following each

election only at the expense of high, albeit short-term, unemployment. The economy would face a regular and unnecessary stop-go cycle which would create uncertainty and interfere with its longer-term growth prospects.

According to the theory, governments could bring about a reduction of inflation without creating a recession only if market agents believed that the monetary authorities were genuinely committed to low inflation – that is, if the statements by monetary authorities that they intended to bring about low inflation were held by market agents to have **credibility**. The difficulty is that market agents, aware of the expansionary incentives faced by governments, will not believe government statements. The past behaviour of the monetary authorities will have given the government an inflationary **reputation**. Under these circumstances, government policies are held to be **time inconsistent**. When the economy is experiencing high inflation, the optimum policy for the government is to reduce the rate of growth of the money supply in order to reduce inflation. However, once the inflation rate has fallen, a new optimum policy emerges – that of expanding the economy in an attempt to reduce unemployment and hence win votes.

We have seen, however, that market agents may be assumed to learn quickly that governments will be attempting to gain at their expense by creating inflationary surprises. It is difficult to understand under these circumstances why voters should also not learn in the same way. If they were to do so, governments would no longer gain votes through monetary expansions prior to elections and would hence lose the incentive to behave in this way. Nonetheless, economists continue to assume that the need to be elected creates incentives for governments to follow inflationary monetary policies, either creating political business cycles or constantly ratcheting up the inflation rate.

In either case, it appears to follow that consistent and tight monetary policies can only be guaranteed if monetary policy decisions are not made by elected governments but are placed in the hands of politically independent central banks (controlled by unelected experts).<sup>6</sup> We have seen problems with the structure of this argument – that the policy ineffectiveness proposition can be criticized from a theoretical perspective *and* does not appear to have strong empirical backing.

<sup>6</sup> Arguments for and against central bank independence are summarized in Box 23.1.

In addition, attempts to find evidence for the existence of political business cycles have not, on balance, been successful. Studies that have claimed to show that such cycles have existed are outnumbered by those that can find no evidence of electoral cycles.

Supporters of politically independent central banks have therefore sought to add strength to their argument through a different kind of empirical study. This has looked at the *degree* of central bank independence and attempted to find correlations between this and the rates of inflation in the respective countries. These studies (see, for example, Alesina and Summers, 1993) have, by and large, claimed to find such correlations within developed economies as well as failing to find correlations between the independence of central banks and rates of economic growth. The implication is that countries with politically independent central banks can maintain lower rates of inflation with no loss in terms of economic growth.

There are, however, several difficulties with these studies. Firstly, the 'independence' of central banks is not easily measured. Many characteristics may contribute to the degree of independence of a particular central bank from its government (Box 23.2 considers such characteristics). These characteristics must be weighted in order to produce some composite index of independence. Such a process may inevitably be subjective and different researchers might rank central banks differently in terms of independence. Although it was accepted that the *Bundesbank* ranked highly on any index of independence, there was sufficient doubt about other central banks to raise doubts about the apparent correlations between independence and inflation rates.

Secondly, the existence of this correlation provides no guarantee of a causal relationship from central bank independence to low inflation rates. It is at least equally plausible that some third factor has been responsible for both the independence of the central bank and the low rate of inflation or, indeed, that any apparent correlation is entirely accidental. For example, it has been argued that low rates of inflation in Germany have been due principally to a strong anti-inflationary attitude among German people as a result of particularly unpleasant (and politically and socially damaging)

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The paper can be found at the ZEI's website: [www.zei.de/download/zei\\_wp/B00-16.pdf](http://www.zei.de/download/zei_wp/B00-16.pdf).

episodes of inflation. This has meant that there has, until very recently, been little or no disagreement among the major political parties over the need to keep inflation rates low. Under such circumstances it was easy for the government to hand power over monetary policy to an independent central bank and there have been relatively few disagreements between the *Bundesbank* and the government over monetary policy.<sup>7</sup> Thus, it may well have been the case that German governments would have followed much the same monetary policy as that chosen by the *Bundesbank*.

Nonetheless, there was during the 1990s a widespread acceptance among economists and politicians of the desirability of politically independent central banks. Although the movement towards making central banks independent embraced non-European economies such as New Zealand and Australia, the key to the changes could be found in the requirement in the Maastricht Treaty on European Union that the European Central Bank (after Economic and Monetary Union) had to be independent of all governments and of the European Commission and that all monetary union member country central banks had also to be independent.<sup>8</sup> This was largely responsible for the increased independence granted to the central banks of France, Spain and Italy. This requirement of

<sup>7</sup> Notable exceptions to this included disagreement over the rate at which Ostmarks were converted to Deutschmarks at the time of German unification, and over a government plan to revalue its holdings of gold in early June 1997 in order to meet more easily the conditions for membership of EMU. The government emerged victorious in the first disagreement; the *Bundesbank* won out in the second.

<sup>8</sup> This issue is dealt with in Section 23.3.

Economic and Monetary Union was thought to be needed to persuade the German people and authorities to participate in EMU since the *Bundesbank* had come to be accepted within Germany as a symbol of the determination to maintain low rates of inflation and to preserve the value of the Deutschmark. This meant that the only way Germany might be persuaded to cede power from the *Bundesbank* to the European Central Bank was if the ECB were made in the image of the *Bundesbank*.

Another major reason for the practical movement towards central bank independence in many countries was the acceptance, in a world of highly mobile capital, of the dominance of financial markets. It has become widely accepted that a country's long-term interest rates might fall if only governments could convince the financial markets of the genuineness of their expressed determination to keep inflation low. One way of trying to achieve this has been to hand control of monetary policy over to the central bank on the grounds that financial markets will have more trust in the anti-inflationary credentials of the central bank than in those of the elected government.

If this in fact occurs, we have a classic example of self-fulfilling beliefs. We have suggested that the theoretical arguments in favour of taking the control of monetary policy out of the hands of elected governments are not strong and that the empirical evidence is also rather weak. It remains that, so long as these views are accepted in financial markets, it will be in the interests of governments to accept them also. Strength is added to this proposition by the view that governments are not, in practice, giving up very much since the increased mobility of international capital has made it increasingly difficult to operate national monetary policies markedly different from those being followed in other countries.

## 14.7 The independence of the Bank of England

It is of interest to apply the above discussion to the issue of the independence of the Bank of England. The first major action of the newly elected Labour government in the UK was to announce, on 6 May 1997, that the Bank of England was to be granted operational independence from the UK Treasury and that interest rates would in future be set by the Bank rather than by the government following consultation with the Bank, as had previously been the case. On the surface, this appeared a somewhat unlikely act since it had been accepted that governments more to the political left would be less willing to give up power over monetary policy to a non-elected body.

We have seen above, however, that so long as the markets believe that the independence of the central bank provides a stronger guarantee of a low-inflation policy, governments may see the granting of independence to the central bank as a route to lower long-term interest rates. Such an argument might be more appealing to left-leaning governments which might be suspected by financial markets of continuing to harbour expansionary aims. The move might also be seen as necessary to give the UK government the possibility of joining Economic and Monetary Union should it wish to do so. It remained that the Chancellor's action in making the Bank of England operationally independent angered a number of traditional Labour Party supporters. In the light of this and of the characteristics in Box 23.2, it is worth considering exactly what additional powers were granted to the Bank of England and what was removed from its control.

Let us consider, firstly, the interest rate decision itself. Under the new regime, interest rates in the UK are determined by the Monetary Policy Committee of the Bank of England. This committee has nine members – five from the Bank of England and four nominated by the Chancellor. This meets the independence requirement that Bank members are in the majority. This is less strong than it seems, however, since the government retains control over the appointment of the future Governor and Deputy Governors of the Bank of England. In addition, government-nominated members of the Monetary Policy Committee will have relatively short terms of office (five years) and be subject to re-appointment. The five-year term contrasts with the 14-year term of office of members of the Board of the

### More from the web Transparency and other aspects of monetary policy

The Bank of England's homepage has a link to 'monetary policy'. This in turn gives access to the minutes and voting decisions of the MPC, a list of MPC members with brief biographies, a list of MPC scheduled meeting dates, the Chancellor's 'remit' to the Bank and much else designed to explain and clarify the conduct of UK monetary policy.

US Federal Reserve. It is generally argued that short terms of office coupled with the possibility of re-appointment allows the possibility of some degree of government influence over existing central bank board members since they may seek to please the government in order to ensure their own re-appointment.

More important, however, is the meaning of the term ‘operational independence’. The Chancellor has retained the power to set the inflation target for the economy, leaving to the Bank what might be seen as the relatively technical job of setting interest rates in order to achieve that target. Thus, the Chancellor has preserved the ability of the government to choose a relatively expansionary policy. In practice, the Chancellor could not have raised the inflation target immediately after the 1997 election, allowing an easing of monetary policy, even if he wanted to do so. Such an action would have caused the market to lose immediately its belief that the granting of greater powers to the Bank gave a guarantee of continued low inflation. In this case, any hoped-for gains in terms of a lower risk premium in UK interest rates would not have materialized. Thus, the Chancellor simply carried forward the inflation target set by the previous government. Nonetheless, the Chancellor gave himself some degree of control over the monetary policy stance to be pursued by the Bank.

Two other issues are of some importance. Until independence, the Bank of England, unlike the *Bundesbank* and the Federal Reserve, had three major functions. It was the country’s monetary authority (under the control of the Treasury); it was the banker to the British government and as such had the responsibility of financing the UK national debt; and it acted as the supervisory authority over the country’s banking system.<sup>9</sup>

In the past, a conflict had often been seen to exist between the first two of these roles. Thus, the need to sell a large amount of government debt may have led the Bank to prefer relatively stable interest rates (to remove uncertainty about future bond prices) at a time when monetary policy appeared to require sharp changes in interest rates. It has been argued that a potential conflict also exists between the roles of monetary authority and banking system supervisor. The point here is that the banking supervisory authority will wish to maintain trust in the banking system by preventing, as far as is possible, the collapse of

banking institutions. If there are a number of banks known to be in weak financial positions, the supervisor might be reluctant to tighten monetary policy for fear that this will force the weaker banks to default. The result might be that a central bank with both supervisory and monetary roles would operate, on average, a looser monetary policy than it would if it did not have supervisory responsibility.

The independence that was announced in 1997 was ratified by the Bank of England Act, 1998. This same Act transferred the management of the national debt to a newly formed Debt Management Office – an agency of the UK Treasury – and the supervisory responsibilities of the Bank to the Financial Services Authority which was in the process of becoming a single supervisory agency for the whole of the UK financial system. The actions of the British government could be seen to have set the Bank free to determine UK interest rates and to remove all possibilities of conflict of interest, allowing a concentration on monetary policy alone. On the other hand, as we have seen, other aspects of the government’s granting of independence to the Bank of England leaves it still subject to government influence to a greater extent than was the case for example with the *Bundesbank*.

#### 14.8 Transparency in the conduct of monetary policy

The consensus that monetary policy was more likely to be effective if conducted by an independent central bank became established over the period of about ten years, from 1989 to 1999. Towards the end of this period, many commentators were advancing the idea that policy would be more effective still if it were conducted in a way that was ‘transparent’. ‘Transparent’ is a strange word to use in this context, since what it means is that:

people can see and understand the decisions being made by the central bank.

In fact, what it means in practice, and certainly what matters if it is to contribute to the effectiveness of policy, is that central bank decisions can be *anticipated*. We look firstly at the conditions that are required for a high degree of **transparency**. This will prepare for us

<sup>9</sup> A function performed in Germany by the *Aufsichtsamt*, the Federal Banking Supervisory Office, for precisely this reason.

a later discussion of why transparency might improve the effectiveness of policy making.

We noted above that an important characteristic of transparency is that agents can anticipate what the central bank is going to do in a given set of circumstances. This means that agents must be able to think like the bank. Certain requirements for this to happen are fairly obvious. Some are less so. Firstly, for people to have any idea of how a central bank might be going to react to any set of economic developments they must have a clear idea of what the bank's target is. Furthermore, this target must be precisely stated and it may help if this is in numerical form. For example, we might know that the central bank wants to maintain 'price stability'. But what does this mean? Zero inflation, or a maximum of 2 per cent per annum, or an average of 2.5 per cent? And does it mean that the bank wishes to achieve this target come what may, with no reference to other objectives? Or does it mean that it is a primary target or a target that is to be achieved only conditional on other objectives (economic growth, full employment) having been already achieved? As we saw in the last section, most central banks state a clear target for inflation. If we look a bit further, at the UK Chancellor's 'remit' to the Bank of England, for example, we will see that a target of 2 per cent,  $\pm$  1 per cent is the primary target of monetary policy. Furthermore, we saw that the Bank of England was recently relieved of any responsibilities which might get in the way of this policy. So we can be fairly certain about what the Bank of England is trying to achieve.

Secondly, we need to know how the central bank thinks its instruments are linked to its targets. This raises the question of the 'transmission mechanism' discussed above. The reason that flow charts showing the link from interest rates to inflation are easily available from the Bank of England and the ECB is because they *want* agents to know how they think interest rates work. Put more formally, this is an attempt to help agents understand the central bank's model of the economy.

Thirdly, we need to know what information the central bank has in front of it at decision time and how it regards that information. In the UK the Bank of England publishes a quarterly *Inflation Report* whose main purpose is to share the relevant macroeconomic information with the general public. The ECB and the US Federal Reserve both publish a monthly report which outlines current economic developments and the authorities' view of those developments.

Fourthly, it helps us understand how the central bank's 'mind works' if we can read the minutes of the meeting at which interest rate decisions are made. A particularly difficult question for policy makers in the UK since 2000 has been the behaviour of house prices. There is no well-established theory linking the behaviour of asset prices to inflation and so we need evidence of how the MPC sees this development. The Bank of England publishes minutes while the Federal Reserve accompanies each interest rate decision with a statement about how the Federal Open Markets Committee saw the situation at the time and how it thinks it might develop. The ECB follows the statement of its decision with a press conference.

Fifthly, it may help us to anticipate decisions if the voting record of the committee is published. This does not have to name names, only to give numbers. For example, if we know that the last meeting voted by a very narrow margin in favour of leaving rates unchanged while the minority was in favour of a rise, we can be pretty sure that the next meeting will decide to raise rates if, in the meantime, evidence of inflationary pressure has increased. It is clear from commentaries in the *Financial Times* that that newspaper relies heavily upon looking at the last vote and then at the balance of economic developments since in order to form a view about the next interest rate decision.

Finally, having a timetable of the meetings at which interest decisions are made, published well in advance, is also helpful in so far as it helps all those interested in monetary policy to focus attention on the event and the publicity which inevitably surrounds it. It also makes it impossible for the authorities to spring surprise interest rate changes.

The first advantage of a monetary policy which agents can understand is that they are very unlikely to be taken by surprise when the central bank raises or lowers interest rates. This is because they know what the central bank is trying to achieve, they know how it 'thinks' and they can see the same developments in the economy that the central bank is taking into account. If agents can largely anticipate the central bank's next step, this means that monetary policy is unlikely to add to any instability already present in the economy. The present Governor of the Bank of England once famously said:

A transparent monetary policy implies that announcements of changes in interest rates by the MPC might come as rather little surprise. The news would not be in the outcome of the meetings of the MPC, but in the economic statistics published during

the month. Markets would be able to anticipate the likely reaction of the MPC, and the decisions by the MPC would follow a predictable policy reaction function . . . It is all part of the view that a successful central bank should be boring. (King, 1997, p. 440)

Secondly, it is argued that a monetary policy which is widely understood is one which it will be very difficult for the authorities to vary at their discretion in order to achieve some alternative short-term goal. Looked at like this, transparency is another way, like rules and independent central banks, of adding to the credibility of policy. If policy is credible, agents believe what the central bank says it is trying to achieve and modify their behaviour in anticipation. Policy works much faster than it would if people had to 'learn' that the central bank was serious about (for example) reducing the rate of inflation.

Thirdly, the question of expectations is linked to credibility. If we recall our discussion of the term structure we remember that medium- and long-term rates are partly determined by what people think will be the course of short-term rates in the future. Furthermore, it is often these medium- and long-term rates which really affect major spending decisions. Medium- and long-term rates are not directly controllable by the central bank but they will rise (for example) if the central bank puts up its official short-term rate and people understand that policy is likely to require further rises in future. If a rise now has no obvious explanation, then future changes must be assumed to be random.

Finally, an argument in favour of transparency can be put in terms of compensating the general public for the independence of central banks from government control. Although independent central banks are usually subject to elaborate arrangements for their accountability (to parliament and to the media, for example) the fact remains that an important area of policy has been transferred to an unelected body. Given that it enjoys such power, it is argued, an independent central bank should be required to conduct its business in the most open way imaginable.

Just like independence, 'transparency' has also come quite quickly to be regarded as a good thing. The Bank of England took a major step in this direction in 1992 when it adopted an explicit inflation target and began publishing its *Inflation Report*. Although it was not independent, the meetings between the Governor and the Chancellor of the Exchequer were put on a regular timetable and minutes of the meetings were

published shortly afterwards. This marked a big step on the road to openness and also constrained, even if it did not eliminate, the scope for political interference in interest rate setting.

Most comparative studies of transparency rate the US Federal Reserve and the Bank of England very highly, along with the Bank of New Zealand and the Bank of Japan. There is a wide divergence of view about the ECB. Much of what it does is designed to make its decisions open and understandable but three characteristics trouble some commentators. The first concerns the way in which the inflation target is set. This, we said, needs to be clear. The UK has always stated a target with upper and lower limits. The ECB, however, began only with an upper limit, of 2 per cent. This absence of a lower limit made it difficult for agents to know what the bank was likely to do next if inflation was below 2 per cent and the European economy is stagnating (as it has been since 2001). In the case of the UK one would expect monetary policy to ease as inflation began to approach the lower limit of 1 per cent but for the ECB it was not clear. A review of monetary policy strategy in 2003 led to a modification of the way the target was expressed from 'below 2 per cent' to 'below but close to 2 per cent'.

The second problem arises from the way in which it says it is guided in its decision-making. This is based on the famous 'two pillars'. The first of these requires the ECB to take into account all relevant economic information. The second requires it to be guided by the behaviour of broad money growth in relation to a 'reference' rate of 4.5 per cent per annum. Firstly, there is a problem about the term 'reference rate'. Is this a target? And if not, why have it? The latter question is especially relevant if the first pillar requires the Bank to take account of all relevant information. If broad money growth is relevant, why is it not covered by the terms of the first pillar. Finally, commentators have noticed that the growth of broad money has usually exceeded the reference rate but rather than raise interest rates the ECB has always managed to find some 'special circumstances' which make this growth unimportant. All these questions and inconsistencies add up to create the impression of some muddled thinking.

Finally, there is the absence of minutes and voting records. We noted above that the minutes and the votes of the last MPC meeting were a very important input into the UK media's ability, when combined with recent developments, to anticipate the next decision, Observers of the ECB are denied these advantages.

**14.9 Summary**

The conduct of monetary policy in most countries has changed markedly in the course of the past 30 years or so. Until the mid-1970s, monetary policy, along with fiscal policy, was frequently used as one element in a programme of demand management which aimed to smooth out fluctuations in real variables like output and employment. The belief that governments had a choice between high levels of output and employment on the one hand and low inflation on the other was symbolized by the original Phillips curve.

From the mid-1970s onwards, however, the idea that real variables could be influenced for any long

period lost conviction. Eventually, as part of the rational expectations revolution, it came to be argued that no real effects were possible at all. However, while monetary theory took this very pessimistic turn, governments continued to operate monetary policy as though sometimes they could boost or restrain demand with beneficial results. This led to the accusation that democratic governments were bound to operate monetary policy with an inflationary bias and that this ultimately eroded a government’s credibility whenever it did wish to reduce inflation. The way to avoid this, it was argued, was to ‘precommit’ monetary policy to low inflation and the popular way of doing this in recent years has been to hand the operation of monetary policy to an independent central bank.

**Key concepts in this chapter**

Transmission mechanism	Backward-looking expectations	Fix-price markets
The simple Phillips curve	Adaptive expectations	Flex-price markets
Monetary stocks	<i>NAIRU</i>	Monetary policy rules
Real/Nominal wages	Natural rate of unemployment	Credibility
Money illusion	Policy irrelevance theorem	Reputation
Expectations formation	Forward-looking expectations	Time inconsistency
Expectations-augmented Phillips curve	Rational expectations	Central bank independence
		Transparency

**Questions and problems**

- 1 Explain what is meant by the transmission mechanism.
- 2 Using the simple Phillips curve, show how governments might use an expansionary monetary policy in order to lower the rate of inflation. Why is there a ‘trade-off’?
- 3 Distinguish between real and nominal wages. If you expect the rate of inflation to be 5 per cent over the next year, what change in nominal wages would you require in order (a) to maintain real wages unchanged; (b) to increase real wages by 3 per cent?
- 4 If the rate of inflation has been running at 3 per cent per annum for the past few years, what increase in nominal wages would you require in order to enjoy a 2 per cent increase in real wages? Explain the assumptions which you have to make in order to answer this question.
- 5 Why does the way in which expectations are formed influence the impact of monetary policy?
- 6 Explain what is meant by a monetary ‘surprise’ and why this may affect the economy in a way that differs from monetary events that are anticipated. Make clear any assumptions that you need to make.
- 7 Why is it argued that governments might seek to create inflationary surprises?
- 8 Explain the ideas behind the notion of the political business cycle. Do they seem to reflect the realities of political behaviour?
- 9 Compare and contrast the ‘transparency characteristics’ of the ECB and the Bank of England.



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Part 5

# Markets



*What you will learn in this chapter:*

- The major instruments which are created and traded in the money markets
- The characteristics of those instruments and how they are priced
- The main participants in the money markets
- The size, growth and recent development of these markets
- The use of money markets by the authorities for policy purposes

## 15.1 Introduction

Financial markets can be classified in many different ways. One very simple and very common classification distinguishes between **money markets** and **capital markets**. The distinction is based upon the length of the loan when it is first made (that is, on the ‘initial maturity’). In money markets, funds are borrowed and lent for a maximum of one year. However, many loans are for less than one year when they are initially made (many are ‘overnight’). This, combined with the fact that many existing one-year loans were made some time ago, means that the average maturity of outstanding debt in money markets is much shorter. Within this two-part classification there are further possibilities. We can distinguish (money) markets for several different instruments; or we can distinguish by the way in which they are traded; or we can distinguish by the identity of the borrower. Table 15.1 provides a list of money markets distinguished largely by instrument. The table begins with those markets where the borrowing/lending is carried out through the issue of securities which can be bought and sold in a secondary market. These are the discount market itself, and the markets for commercial paper (CP) and certificates of deposit (CDs). We then subdivide the discount market by borrower, noting that it trades bills issued by three distinct classes of borrower. By contrast, the interbank market is a ‘market’ for deposits that cannot be traded. Money market deposits have much the same

**Table 15.1** Money markets

The discount market	
Treasury bills	<i>d</i>
Local authority/utility bills	<i>d</i>
Commercial bills	<i>d</i>
The market for commercial paper	<i>d</i>
The certificate of deposit market	<i>y</i>
The interbank market	<i>y</i>
Money market deposits	<i>y</i>
Repurchase agreements	<i>y</i>

*d* quoted on a *discount* basis; *y* quoted on a *yield* basis

characteristics. Repurchase agreements involve a sale of securities with an agreement to buy them back in the near future for a price that determines the cost of the funds obtained. One consequence that follows from this variety of short-term instruments is that they are priced (or ‘quoted’) in two different ways. Some are quoted on a **yield basis**, while others are quoted on a **discount basis**. We note this distinction in the table (by *y* and *d* respectively) and explain it in the next section. Finally, we need to bear in mind that most of these markets exist for instruments issued in the domestic currency, and also, increasingly, for instruments denominated in a currency other than that of the country in which they are traded. Such instruments are identified by the prefix ‘Euro-’, though this is strictly a misnomer since the currency can be *any* currency (US or Hong Kong dollars, or Yen, for example). Hence, most financial centres trading CDs and commercial paper will also trade Euro-CDs (ECDs) and ECP.

Although Table 15.1 shows an apparently wide variety of instruments available to short-term lenders and borrowers, the fact that they are all short-term instruments makes them very close substitutes for one another. This in turn means that price movements (for money market securities) and movements in rates of return (for all money market instruments) are very highly correlated. It also means that differentials between the returns on different instruments are usually very small. This is reinforced by the fact that money markets are usually dominated by large traders – banks, savings institutions, government and corporate treasury departments – to whom small differences in yield can still mean large differences in profit or loss. One consequence of this is the need for a convenient form for expressing fractions of yields or interest rates. This is done by quoting **basis points** (or bps) where one basis point equals 1/100 of 1 per cent. Basis points have become an internationally recognized standard. Of course, it follows equally that some method is needed for quoting small changes in price. Alas, these methods are not universal. In the UK and USA the smallest unit of price change is 1/32 while in continental Europe the unit is 0.01.<sup>1</sup> For some reason, both units have come to be known as *ticks* in everyday use. But saying in London that UK treasury bills are ‘up three ticks’ suggests a larger price change than a similar remark about *Schatzwechsel* in Frankfurt.

<sup>1</sup> We have used decimals rather than fractions in all illustrations and exercises.

Distinguishing financial markets into markets for ‘short-’ and ‘long-term’ loans is common practice, and useful since instruments within each category are close substitutes for each other. But, while some institutions have a particular need to lend or borrow short term while others specialize in long-term lending or borrowing, most lenders and borrowers use both groups of markets at some time. For example, remember what we said in Section 10.4.1 about the effect of interest rate expectations on lenders’ decisions. Imagine a lender who normally prefers to lend for a short period (in the money markets). If he thinks that short-term rates are likely to fall in the very near future, he might prefer on this occasion to lock into current rates for a longer period (via the capital markets). Equally, firms who think that interest rates will be lower in future might decide to borrow short on a temporary basis in spite of their normal preference for long-term borrowing.

As a source of short-term finance, the money markets are, naturally, important to a wide range of institutions. They are important also for another reason which takes us back to Chapter 9 ‘The level of interest rates’ and Chapter 12 ‘Bank lending and the money supply’. This is that central banks exercise their influence over short-term interest rates, via the money markets (either the discount market or interbank market in practice). Money markets are the focus for this official activity for a combination of reasons. Firstly, as we all know, banks offer a guarantee to their clients that their deposits can be converted on demand into cash and therefore banks need to hold the necessary liquid reserves. Secondly, because these reserves (generally) pay no interest, banks hold the minimum quantity; their demand for reserves is highly interest-inelastic. Thirdly, since banks must make settlement on a day-to-day basis, shortages of reserves must be relieved by immediate (that is, *very* short-term) funds. Finally, in a system-wide shortage of funds the central bank becomes the sole supplier. We shall see how this works, in a little more detail, in Section 15.4.

In the next section, we explain the characteristics of each of the instruments being traded in the money markets. In Section 15.3 we look at the use and characteristics of the markets themselves in each of several European centres; in Section 15.5 we note the rapid growth of Eurocurrency markets and the causes and consequences of this growth. Section 15.6 summarizes.

## 15.2 Money market instruments: characteristics and yields

### 15.2.1 The discount market

This is a market in which short-term securities are issued and traded. Bills are usually issued with initial maturities of from one to three months, six months, and, less usually, 12 months. For this reason, it would be inconvenient and expensive to set up the arrangements for paying interest in the normal way, for securities which would attract at most one interest payment, and so the practice is to issue the bills at a discount to their *par* or maturity value. Thus a three-month bill with a par value of £250,000 might be issued for £240,000, a discount of £10,000. Clearly it is essential that the amount by which the bill is discounted should be convertible into a *rate* in order to allow comparison with the return on other financial instruments. The simplest way to do this is to calculate the return as a *rate of discount*,  $d$ . The formula for the **rate of discount** is:

$$d = \frac{M - P}{M \cdot n_{sm}} \quad (15.1)$$

where  $P$  is the price,  $M$  is the par or redemption or maturity value and  $n_{sm}$  is the period to redemption (that is, from settlement of purchase to maturity) *expressed as a fraction of a year*. In the UK, a year is reckoned as 365 days while in the US markets and in continental Europe it is taken to be 360 days. In our example, therefore, the discount of £10,000 is equivalent to a *rate of discount* of:

$$d = (250,000 - 240,000)/(250,000 \times 0.25) = 16\%$$

Notice that as the bill approaches maturity, the value of  $n_{sm}$ , and thus the value of the denominator, falls. If nothing else changed, therefore, the return on the bill would increase as it approached maturity. To prevent this from happening, it is the bill’s price that rises as it approaches maturity.

By rearranging Equation 15.1, it is quite easy to find the price at which a bill must be sold in order to yield a given rate of discount. Suppose, for example, that we wish to lend for two months at a rate of 10 per cent. Then:

$$P = M - d(M \cdot n_{sm}) \quad (15.2)$$

and thus:

$$P = 250,000 - 0.1(250,000 \times 0.166) = 245,835$$

Equation 15.1 enables us to compare the return on all securities where the return is calculated on a discount basis. But these are not directly equivalent to returns calculated on the more familiar yield (or ‘add-on’ in the USA) basis. This is because on a discount basis the gain (£10,000) is being expressed as a proportion of the maturity value of the security – the sum received *on redemption*, whereas a conventional rate of interest is calculated by expressing the gain as a fraction of the *outlay*. In our first example, we can see that if we substitute £240,000 (the outlay) in the denominator, the discount of £10,000 converts to a rate of interest of 16.6 per cent. If we let  $i$  stand for the interest rate (or ‘add-on’ rate or **equivalent yield**), then this can be found as follows:

$$i = \frac{M - P}{P \cdot n_{sm}} \quad (15.3)$$

and it is a simple task to compare Equations 15.1 and 15.3 in order to see that the maturity value in the denominator of Equation 15.1 is replaced by the smaller (discounted) market price in Equation 15.3. *Given* either the yield or the rate of discount we can convert between the two as follows:

$$d = \frac{i}{1 + i \cdot n_{sm}} \quad (15.4)$$

$$i = \frac{d}{1 - d \cdot n_{sm}} \quad (15.5)$$

It is important to remember that a rate of discount offers a better return than a yield of the same numerical value.

Bills are often distinguished by their origin. They are issued by central government, local authorities and financial and non-financial institutions. We say more about these distinctions in the next section.

### Exercise 15.1

A one-month bill for £100,000 is issued at a discount of £1,000.

Find:

- 1 the *rate* of discount
- 2 the equivalent yield
- 3 the price at which it will trade with two weeks remaining to maturity, market interest rates unchanged.

## 15.2.2 The commercial paper market

Commercial paper (CP) is the other market in which funds are priced on a discount basis. In effect, a firm issues a promise to pay the holder of the paper at some specified future time. In most countries, access to the market is regulated, usually by specifying that firms must have a stock exchange listing and meet some minimum capital requirement. As a rule, the promise to repay is unsecured by any specific assets and this has led many firms issuing commercial paper to seek a credit rating from one of the major bond rating agencies. The difference between the yield on the highest rated paper and unrated (‘junk’) paper varies between 100 bp (that is, 1 per cent) and 150 bp. Most paper is issued with an initial maturity between 7 and 45 days. Because of the short duration, there is little by way of a secondary market for commercial paper. The issue is usually handled by a specialist commercial paper dealer, often a subsidiary of a bank, and the dealer will usually offer to repurchase CP from investors.

Yields are calculated in exactly the same way as the (discount) yield on a bill (see Equation 15.1). In Europe, the CP market is a product of the past 20 years or so (only 1991 in Germany), though it began in 1970 in the USA, where it is now very large, accounting for over 80 per cent of the world total of commercial paper in issue. Amongst the European countries, France has the largest domestic CP market. In the UK the market has remained comparatively underdeveloped, partly because bank lending, as an alternative source of finance, has been comparatively free of restrictions for many years and also because firms prefer the traditional discount market which is very highly developed in the UK and has the attraction that the Bank of England stands as a ready buyer of many bills. (See Section 15.4.)

## 15.2.3 The certificate of deposit market

A certificate of deposit is a statement to the effect that a lender has deposited a specified quantity of funds for a specified period with a specified bank at a specified rate of interest. It is, in other words, a receipt for a time deposit. As with other money market instruments, denominations are comparatively large (a minimum of £50,000 in the UK, \$100,000 in the USA). The significance of having such a receipt lies in the fact

that in most countries there exists an active secondary market in which they can be traded, making them into *negotiable* CDs (NCDs). Thus we have a situation with the traditional advantages of a time deposit (the borrower gets a large loan for a fixed period, the lender receives a premium rate of interest as compensation for the loss of liquidity), but one with the added advantage that the lender can, if needs be, have instant access to funds by selling the CD. Because of this liquidity, the borrower pays and the lender accepts a slightly lower rate of interest than would be the case on a corresponding time deposit with no certificate. Just like bills or commercial paper, a CD has a maturity value (equal to the sum deposited plus the interest payment initially agreed upon). However, unlike bills and CP, CDs are priced on a *yield basis*. The interest paid on the CD is often linked to the rate paid on money market deposits (see *interbank deposits* below). Thus, if a three-month interbank deposit paid interest of 10.25 per cent, the equivalent CD might be priced on the basis of LIBID (London Interbank Bid Rate) less 0.25 per cent, that is, 10 per cent. In the circumstances, the 10 per cent payable on maturity is equivalent to the *coupon rate* ( $c$ ) on a conventional bond and the maturity value in three months' time will consist of the initial deposit ( $D$ ) plus interest payment. In this case, therefore:

$$M = D \times (1 + c \cdot n_{im}) \quad (15.6)$$

where  $n_{im}$  is the number of days from *issue* to *maturity* as a fraction of a year. The market price of the CD is then given by discounting the maturity value by the current yield adjusted for the period to maturity. Thus:

$$P = \frac{M}{1 + i \cdot n_{sm}} \quad (15.7)$$

If, as we have assumed here, the coupon rate reflects the yield currently available on comparable three-month instruments at the time of issue, then,

$$M = 100,000 \times (1 + [0.1 \times 0.25]) = 102,500$$

and  $P = 100,000$ , the issue price.

However, if market rates of return on comparable instruments change, this will be reflected in a change in the price of CDs. Imagine, as an example, that after one month the yield,  $i$ , on two-month negotiable instruments falls to 8.5 per cent. Then, using Equation 15.7, we can see that the price of our CD will be:

$$102,500 / (1 + [0.085 \times 0.166]) = 101,156$$

(Check that the market price at two months to maturity would have been £100,826 if the yield had remained at 10 per cent.) Given the pricing equation (Equation 15.7), it follows that if we know the price at which a CD of given coupon and given maturity is trading, we can find its current yield. This is done by expressing the gain, the difference between purchase price and maturity, as a percentage of the purchase price and adjusting that percentage to an annualized rate:

$$i = \left( \frac{M}{P} - 1 \right) \cdot \frac{1}{n_{sm}} \quad (15.8)$$

Readers should satisfy themselves that Equation 15.8 is equivalent to Equation 15.3.

The first negotiable CD market began in New York in 1961, the sterling CD market opening in London in 1968. Since then markets for negotiable CDs have grown rapidly in all European centres with the exception of Germany. The problem for German banks until recently has been the comparatively high reserve requirement on time deposits. As we noted in connection with quantitative controls on bank balance sheets (Section 12.5), a non-interest-bearing reserve requirement acts as a tax on banking activity. If, for example, a bank issues a €500,000 CD on which the reserve requirement is 5 per cent, then it can on-lend only 95 per cent of the deposit, that is, €475,000. Suppose now that interest rates (and thus the coupon rate on the CD) are 10 per cent. The reserve requirement has the effect of raising the cost of the deposit to the bank by 52 basis points ( $0.1/0.95 = 0.1052$ ). This puts domestic CDs at a disadvantage with Euro-CDs and with other domestic instruments where reserves are lower. Indeed, the exceptionally rapid growth of the Eurodollar-CD market is partly explained by tough reserve requirements on domestic dollar CDs in the USA. The *Bundesbank* lowered reserve requirements in February 1993 and this did encourage an expansion of the DM-CD market.

#### Exercise 15.2

- 1 Find the value of a 5% negotiable six-month CD for £200,000.
- 2 What would its price be if interest rates were 6% when 146 days remained to maturity?
- 3 What would its current yield be if its market price were £195,000 with 146 days remaining?



### 15.2.4 The interbank market

Unlike the other money markets, the interbank market is a market for (non-negotiable) deposits. The deposits can be disposed of only by withdrawing them from the borrower. The initial maturity of the deposits can range from overnight to one year, though the shorter maturities are the more popular. The deposits are the assets of banks with surplus funds and the liabilities of banks who bid for them in order to fund their lending commitments. Thus, the deposits provide an attractive means whereby individual banks can adjust their cash position, being neither too liquid (forgoing profitable lending) or short of liquidity (with the possibility in the extreme case of being unable to honour customers' cheques). The use of the market by banks making continuous adjustments to their liquidity positions largely accounts for the high level of activity at the short end of the maturity spectrum.

The interest rate paid on interbank deposits represents the marginal cost of one important source of funds for banks. A decision to lend may require the lending bank either to withdraw deposits which it earlier made in the market or to attract funds from other banks. Clearly, the loan must offer a return which covers the (opportunity or explicit) cost of funds and thus will be priced on the basis of interbank rate, *plus* a mark-up reflecting the risk thought to attach to the loan. In the UK, the interbank rate is known as Libor, London Interbank Offer Rate, and is widely used as a benchmark rate for setting loan and deposit rates by the addition or subtraction of appropriate margins. Equivalent rates can be found in all financial centres (PIBOR in Paris, FIBOR in Frankfurt, for example).

#### Exercise 15.3

Moneylenders plc arranges a purchase of securities for £5,900,000 with an agreement to resell them in 70 days for £6,000,000.

- 1 What is the repo rate earned by Moneylenders plc?
- 2 For what price would they have to be resold in order to provide a return of 10 per cent?

### 15.2.5 Money market deposits

Money market deposits are large, fixed-term, bank deposits made by non-banks. These are usually large corporations but may be municipalities or other public bodies. In the UK, it is also the custom for local authorities to *borrow* by accepting large fixed-term deposits. These are usually for seven days, though sometimes longer. All such deposits pay interest at rates linked to interbank rate.

### 15.2.6 Repurchase agreements

A repurchase agreement is an agreement to buy securities from a seller on the understanding that they will be repurchased at some specified price and time in the future. In this deal, the seller is the equivalent of the borrower and the buyer is the lender. The repurchase price is higher than the initial sale price, and the difference in price constitutes the return to the seller. Deals are quoted on a yield basis, using Equation 15.3 (or 15.8). Thus if the *Bundesbank* agrees to a repurchase deal with a German bank, involving treasury bills, it may buy them for €1m, agreeing to resell in three months for €1.008m. If so, the yield can be found as follows:

$$i = (1.008 - 1.0) / (1.0 \times 0.25) = 3.2\%$$

In this example, the sale price of €1m is likely to be slightly less than the market value of the bills at the time of purchase. This margin offers some protection to the lender in case the borrower goes bankrupt or defaults for some other reason. The size of the risk, and thus this margin, depends in large part upon the status of the borrower, but it also depends upon the precise nature of the contract. Some repo deals are genuine sales. In these circumstances, the lender owns the securities and can sell them in the case of default. In some repo contracts, however, what is created is more strictly a collateralized loan with securities acting as collateral while remaining in the legal ownership of the borrower. In the case of default, the lender has only a general claim on the lender and so the margin is likely to be greater.

### 15.2.7 Reading the *Financial Times*

Commentary and data on money market behaviour are carried on the *Financial Times* 'Currencies and

**Box 15.1 Reporting the money markets****FT**

## UK INTEREST RATES

May 17	Over-night	7 days notice	One month	Three months	Six months	One year
Interbank Sterling	$4\frac{7}{16} - 4\frac{1}{4}$	$4\frac{13}{32} - 4\frac{1}{4}$	$4\frac{13}{32} - 4\frac{9}{32}$	$4\frac{1}{2} - 4\frac{3}{8}$	$4\frac{23}{32} - 4\frac{19}{32}$	$5 - 4\frac{7}{8}$
BBA Sterling	$4\frac{13}{32}$	$4\frac{7}{16}$	$4\frac{7}{16}$	$4\frac{1}{2}$	$4\frac{11}{16}$	5
Sterling CDs			$4\frac{5}{16} - 4\frac{9}{32}$	$4\frac{13}{32} - 4\frac{11}{32}$	$4\frac{9}{16} - 4\frac{17}{32}$	$4\frac{27}{32} - 4\frac{13}{16}$
Treasury Bills			$4\frac{5}{16} - 4\frac{9}{32}$	$4\frac{13}{32} - 4\frac{11}{32}$		
Bank Bills			$4\frac{5}{16} - 4\frac{9}{32}$	$4\frac{13}{32} - 4\frac{3}{8}$		
†Local authority deps.		$4\frac{1}{4} - 4\frac{1}{8}$	$4\frac{3}{8} - 4\frac{1}{4}$	$4\frac{7}{16} - 4\frac{5}{16}$	$4\frac{5}{8} - 4\frac{1}{2}$	$4\frac{7}{8} - 4\frac{3}{4}$
Discount Market deps	$4\frac{1}{2} - 4\frac{1}{4}$	$4\frac{7}{16} - 4\frac{5}{16}$				

Av. tndr rate of discount May 7, 4.2612pc. ECGD fixed rate Stig. Export Finance. make up day Apr 30, 2004.

Reference rate for period Apr 1, 2004 to Apr 30, 2004, Scheme IV & V 4.391%. Finance House Base Rate 4.5pc for Feb 2004

UK clearing bank base lending rate  $4\frac{1}{4}$  per cent from May 6, 2004

Source: Reuters, RBS, †Tradition (UK) Ltd.

	Up to 1 month	1-3 month	3-6 months	6-9 months	9-12 months
Certs of Tax dep. (£100,000)	$\frac{1}{4}$	3	3	3	3
Certs of Tax dep. under £100,000 is $\frac{1}{4}$ pc. Deposits withdrawn for cash Opc.					

Source: *Financial Times*, 'Currencies, Bonds and Interest Rates' page, 18 May 2004.

Money' page. Much of the material in which we are interested here, therefore, is intermixed with information about exchange rates.

Box 15.1 reproduces the table that is most relevant to the present discussion. The 'UK Interest Rates' table shows interest rates available on each of the instruments described above, for different periods to maturity as appropriate. Looking firstly at the table as a whole, it amply confirms what we said earlier about the market dealing in instruments with a high degree of substitutability and with very small differences in yields. The difference between  $13/16$  and  $27/32$  explains why we need 'basis points'! Looking next down the 'one month' column we can see that a bank could lend in the interbank market at an (equivalent annual) rate of  $4 + 9/32$  per cent and could borrow at  $4 + 13/32$  per cent. Other assets of the same maturity yield returns which are very close indeed. If we look further down the one-month column we see that sterling CDs, treasury bills and bank bills all appear to offer the same return. But remember that the return on treasury bills is quoted as a rate of discount and that the comparable yield is a bit higher. So treasury

bills here offer a very slightly higher return than CDs and commercial bills. That is unusual since treasury bills, being government instruments, have a lower risk than CDs and commercial bills, though such differences are very small. Reading across the table, we see that interest rates rise slightly with increases in the term to maturity. The 'time-yield curve' slopes upward. As we shall see in Section 16.5, a popular explanation for the term structure of interest rates is that longer-term rates reflect expectations of future short-term rates. The facts here certainly fit that theory since the Bank of England was being quite open that it was expecting to have to raise interest rates in the near future.

The 'Currencies, Bonds and Interest Rates' page carries a wide range of additional tables. One of these gives short-term market interest rates for maturities up to one year in a variety of international markets. Here one can find US dollar repo rates, Swiss franc, yen and euro interbank rates and sterling Libor (London Interbank Offer Rate – essentially the BBA rate in Box 15.1). There is also a table showing the official, central bank, rate for major financial centres.

### 15.3 Characteristics and use of the money markets

The bills that are traded in the discount market usually come from one of three sources.<sup>2</sup> The major, and historically the most important, source is the central government treasury. Such bills are known as *Treasury Bills* in the UK and USA (usually shortened to T-bills in the latter); *bons de trésor* in France and *Schatzwechsel* in Germany. Although treasury bills circulate quite widely after issue, at least between financial institutions, they are usually sold initially to designated institutions. These are banks and discount houses in the UK; anyone with a central bank account in France; any institution registered also for the purchase of government bonds in Germany and to 'primary dealers' in the USA. Their initial issue usually involves a sale by auction (weekly in the UK, France and USA but with no set timetable in Germany). Auctions can take one of two forms: the **bid-price** auction where successful bidders pay the price that they bid, and **striking-price** auctions where bids are ranked by descending value and all successful bidders pay the (uniform) price of the lowest bid necessary to clear the market. As a general rule, the 'bid-price' auction is the more common. (In the UK, the striking-price method is sometimes used for the auction of bonds, when the process is known as a *tender*. In the UK, therefore, 'auction' tends to mean 'bid-price auction'.) Amongst money market instruments, treasury bills tend to offer the lowest yield, since they are default-free and also because most central banks are prepared to discount treasury bills on demand for cash which is important to deposit-taking financial institutions who in turn guarantee to supply cash on demand to their depositors. We shall see in Section 15.4 that treasury bills and 'eligible' commercial bills (see below) feature largely in central bank operations to set short-term interest rates.

In much of continental Europe, but not in the UK, there are also large markets for local authority (*municipalité, département, Länder*) bills and bills issued by public corporations such as SNCF, *Deutsche Bundesbahn* and *Deutsche Bundespost*.

The third major source of bills is large corporations. A *commercial bill* is a promise by one firm to

pay another a fixed amount at some specified time in the near future. As with treasury bills, the initial maturities range usually from one to six months. The promise is given in respect of some good or service which has been purchased and the par or maturity value of the bill includes a sum over and above the value of the goods, which is the interest payable to the seller for having to wait for payment. The seller 'draws' a bill on the buyer of the goods who 'accepts' the obligation to pay at a specified time and place. The point about a market for these bills, however, is that once issued they can be traded. The supplier, in our example, need not wait until the bill matures in order to receive payment. The bill can be sold whenever funds are required. Assume for simplicity that short-term interest rates are unchanged since the bill was first drawn up. The price obtained will stand at a discount to the maturity value and the size of the discount will depend upon factors with which we are now familiar. It will depend upon the period to maturity (since this determines the *rate* of discount). It will also depend upon the market's assessment of risk, which in this case means the risk that the issuer of the bill will default. If short-term interest rates *do* change then the discount will get bigger (as rates rise) or smaller (as rates fall).

The fact that the discount rate on commercial bills depends upon the risk of default means that discount rates on commercial bills are generally higher than rates on government or public authority bills. It also gives rise to an important distinction between classes of bills. Some bills may be drawn on banks which have agreed to accept them on behalf of the buyer of the goods. Since the status of such banks is generally well known, their acceptance of bills usually leads to such bills (*bank bills*) carrying a lower rate of discount than they would if they had been accepted by the buyer of the goods. Furthermore, acceptance by certain specified banks, of the highest standing, renders the bill *eligible* for discount with the central bank. This in turn means that the central bank guarantees to discount these bills for cash in the event of a system-wide shortage of liquidity. This immediately gives these bills a special status since they have almost the characteristics of deposits with the central bank while at the same time they provide a positive rate of return. All deposit-taking institutions hold some

<sup>2</sup> For a detailed discussion of the mechanics of bill issue, acceptance and discounting see Valdez (1993) Ch. 5.

eligible (commercial) bills and treasury bills as second-line reserves.

In the UK, the commercial bill market received a considerable boost starting in 1974 as a result of what became known as the ‘bill-leak’. At several intervals during the 1970s the Bank of England tried to limit bank lending (and monetary growth) by penalizing banks which allowed their interest-bearing deposits to grow beyond set limits (see Section 12.5). As a result, frustrated firms took to raising short-term funds by issuing bills to which banks gave their acceptance. Thus firms, for the most part, got the funds they required while banks were able to replace lost interest income with fee income from supporting the bill issues. For UK banks this was one of the earliest introductions to ‘off-balance-sheet’ activity, an issue to which we return in connection with regulation of financial institutions in Chapter 25.

In the next section we shall see that central banks conduct ‘open market’ operations, of various sorts, in many of the instruments traded in the money markets in order to influence short-term interest rates. It is only with treasury bills, however, that central banks are involved in the ‘primary’ or new issue market. With all other instruments central banks are operating in the secondary market – the market for instruments already issued by the private sector. Since it is a characteristic of all money market instruments that their minimum denominations are very large (Ffr1m for *bons de trésor*, £0.1m for UK commercial paper, \$10,000 for US t-bills, for example), it is easy to understand that money markets are markets for ‘wholesale funds’. The borrowing and lending involves government and large financial and non-financial corporations. Access to money markets for the personal sector has to be indirect, through some intermediary that is prepared to pool small investors’ funds, purchase money market instruments and then pass on money market interest rates (less a deduction for expenses) to investors. In the United States, where access to interest-bearing deposits was further restricted by ‘Regulation Q’ until 1980, the demands of small investors gave rise to the ‘money market mutual fund’. Between 1973 and 1980 US MMMFs’ assets grew from nothing to over \$200bn. The impact on banks was considerable, as the personal sector withdrew deposits in order to get the market interest rates offered by MMMFs, and led to the ending of regulation Q in 1980. From 1982, banks were allowed to offer deposit accounts to ‘retail’ customers which

offered both money market rates and limited checking or payment facilities.

Similar developments occurred in the UK in the late 1970s, though here it was the minimum size of money market instruments rather than regulation that excluded the personal sector from the market. These minimum thresholds led some merchant banks to offer ‘high interest cheque accounts’ to selected customers. Once again, the principle was to pool retail deposits and use them to buy large denomination CDs, bills or money market deposits. As with US MMMFs, UK banks found that they needed to impose restrictions on such accounts in order to pay the highest possible rates while keeping the operating costs of such accounts to a minimum. In 1980, for example, a typical account required a minimum deposit of £2,500 (equivalent to £7,000 in 2004 – quite high for the personal sector) and set a minimum value for each cheque transaction of £100 (in order to limit the number of transactions for which the account would be suitable).

#### 15.4 Official intervention in the money markets

In Section 12.5 we examined a number of techniques that the monetary authorities in any country could use in order to influence the rate of growth of bank lending and money supply. The list was long, but we could divide the techniques into ‘direct’ or quantity controls and ‘indirect’ or ‘market-based’ controls. We noted in that section that most countries had at some time experimented with some forms of direct control but that in recent years the trend had been towards market-based methods. Indeed, according to a recent survey (Borio, 1997), there is little difference in monetary policy *operating techniques* between the major economies. Essentially, ‘market-based’ simply means setting the level of short-term interest rates and allowing the market to determine both the quantity and the distribution of money and credit. Clearly, setting the level of short-term interest rates must involve some form of official intervention in the money markets. The main theme of this section is the form that this intervention takes.

In all cases, the central bank uses open market operations in order to exploit its position as the monopoly supplier of bank reserves.

In practice, ‘operating on bank reserves’ is consistent with the central bank behaving in a number of different ways which can be characterized along a spectrum. At one end of this spectrum, the central bank can set the rate of interest which it wishes to see form the basis for all other short-term rates. In order to maintain this rate, the central bank will have to supply whatever quantity of reserves banks require. In effect, in this situation, the supply of reserves is perfectly elastic at the target interest rate. In Figure 15.1, demand for reserves increases from  $D_1$  to  $D_2$ . In order to maintain the target interest rate at  $i^*$ , reserves are supplied in whatever quantity is necessary along  $S_1$ . Alternatively, the CB can set a quantity target for reserves, engaging in open market operations so as to provide only the target quantity. In this case it must accept whatever level of short-term rate is necessary to clear the market. In Figure 9.1 the target quantity of reserves is shown by  $R^*$ . In these circumstances, the increase in demand takes us along  $S_2$  to an interest rate  $i'$ .<sup>3</sup>

Economic theory suggests that the choice between these extremes should depend upon the nature of the origin of the shock to the demand curve. If, for example, the increase in demand for reserves results from an aggregate demand shock which threatens to push demand beyond its trend growth rate, then accommodating the demand for reserves at the going rate of interest enables banks to respond to demands for money and credit which may lead to higher inflation. If, by contrast, the shock stems from an increase in demand for money resulting from financial innovations which cause agents to wish to hold more money in their wealth portfolios, then holding to a rigid reserve quantity target will cause interest rates to rise with a generally deflationary effect upon the real economy. The emerging consensus amongst central banks during the 1980s was that shocks to the demand for reserves were increasingly the outcome of changes in portfolio

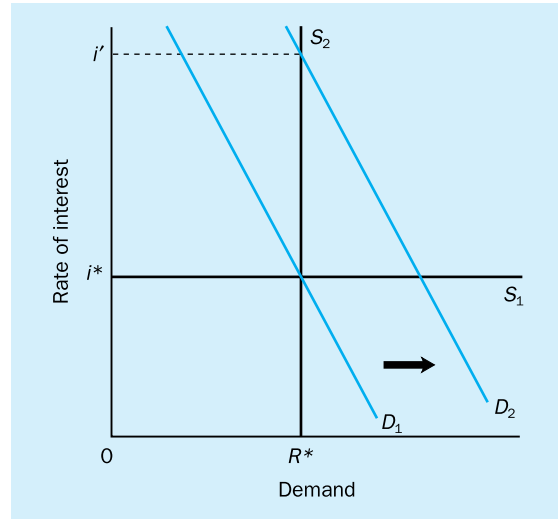


Figure 15.1 Interest versus reserve targeting

preferences. Thus, the tendency was increasingly towards interest rate targeting and reserve accommodation. Behind this, however, was an increasing awareness of the *practical* difficulties involved in operating quantitative controls over the monetary base. These were outlined earlier, in Box 12.4.

In practice, therefore, central banks choose to set the price rather than the quantity of reserves and thus make the setting of short-term interest rates their chosen policy instrument. This they do by making reserves available, at the target price.<sup>4</sup> Changes in officially determined rates are then transmitted by arbitrage (or sometimes simply by conventionally determined mark-ups) to a broad spectrum of short-term rates. Changes in short-term rates then affect the price of bank loans and thus the quantity demanded, as well as affecting the return on a wide variety of assets. If the change in these returns is a change *relative* to the rate of return on money, then there is

<sup>3</sup> This discussion, and Figure 15.1, both involve an element of simplification. Both describe a static situation whereas, in practice, the demand curve is continually shifting to the right. A *quantity* target is not therefore a target set at an absolute level ( $R^*$ ) in the figure, but a target *rate of growth*. In Figure 15.1, this would appear as limiting the rate at which the supply curve,  $S_2$ , was allowed to move to the right. With a quantity target the rightward shift of the supply curve would often be less than the rightward shift of demand, and interest rates would rise. An interest target would require that the supply curve were allowed to shift rightward at the *same rate* as the demand curve.

<sup>4</sup> We need to be careful to distinguish (minor) day-to-day changes in the demand for reserves which result, for example, from payments between the treasury and the private sector. These are always routinely accommodated since it would be impossibly disruptive to have day-to-day interest rates fluctuating, perhaps quite dramatically, around a stationary mean. The shocks we have discussed here are shocks which are sufficiently major, and sustained, as to require a discretionary policy response.

an impact also on the quantity of money demanded.<sup>5</sup> Equally, changes in short-term rates in one country change the rate of return on short-term assets in that country relative to others and cause changes in exchange rates via capital flows.

Essentially, central banks can influence interest rates by exploiting their position as lenders of last resort or monopoly suppliers of liquidity in a general shortage. Since the tendency is for most economies to expand over time (and for nominal values to increase where inflation is positive) there is almost always a positive demand for net new bank lending (and net new deposits) at current interest rate settings. This generates the parallel tendency for banks to require recurrent increases in reserves (which as we saw in Section 12.3 are liabilities of the central bank). This is further reinforced by the fact that central banks have always met some of this demand by lending reserves on a short-term basis. The fact that this assistance is continuously maturing means that banks have a continuing need for new assistance which central banks can supply at rates of their own choosing (though subject of course to the (mainly international) constraints which we touched on in Section 9.4). The facilities through which the central bank can provide assistance are virtually the same in all countries. Firstly the central bank can engage in one or other form of *open market operations*. This simply means entering the money markets itself as a buyer (or seller). Alternatively, it can lend directly to banks (*‘through the discount window’* as it is sometimes called). The past 15 years or so have seen a considerable convergence in money market intervention techniques (for reasons we explain below). The most obvious is a decline in the amount of discount window lending and greater emphasis upon open market operations, particularly, in recent years, repurchase agreements. Lending via the discount window still takes place in the USA (at ‘discount rate’) but direct lending is now a marginal source of funds in all developed systems.

‘Open market operations’ simply means the authorities’ buying and selling of securities in markets open to all participants. For example, let us suppose that a central bank wishes to raise interest rates, using

#### More from the web Central bank money market operations

As we were revising this book, the Bank of England announced its desire to consult with money market participants on possible changes in its methods of operation. The main concern appeared to be that sterling overnight rates were more volatile than those in other financial centres.

The issues on which the Bank wishes to consult are set out in the document *Reform of the Bank of England’s operations in the sterling money markets*. This can be downloaded from the Bank’s website: [www.bankofengland.co.uk/markets/money/smmreform040507.pdf](http://www.bankofengland.co.uk/markets/money/smmreform040507.pdf)

Another document, *The Bank of England’s operations in the sterling money markets*, was published in May 2002 and describes current practices. It can be downloaded from the Bank’s website: [www.bankofengland.co.uk/markets/money/stermm3.pdf](http://www.bankofengland.co.uk/markets/money/stermm3.pdf)

open market operations. In such a case, it may offer to buy treasury or eligible commercial bills at a lower price than it did on the last occasion of assistance. This increase in the official discount rate is usually sufficient to signal to all market participants that all short-term rates should change by a similar amount. Alternatively, it may enter the repo market as a buyer, but again offering to buy at a price that represents an increase in the cost of funds to borrowers. If it wishes rates to remain as they are, which is of course the more common case, it simply offers to deal at current prices and yields. Box 15.2 contains a report of the *Bundesbank* signalling a cut in interest rates by offering cheaper repurchase facilities. Although it dates from 1996, we include it because the *Financial Times* report shows so clearly how a change in the official repo rate set by any major central bank sends repercussions through closely related markets. Much the same would be true if we were looking at action by the ECB.

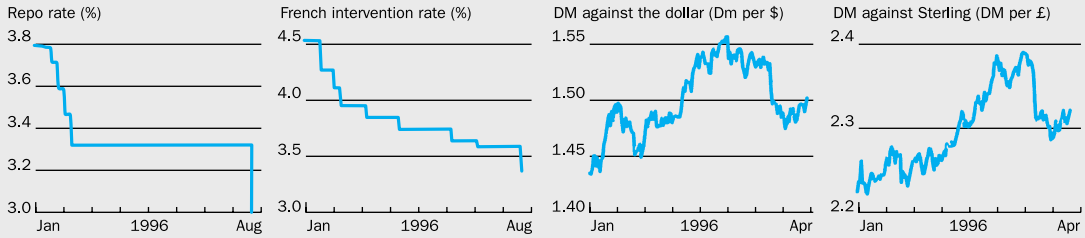
<sup>5</sup> This is a condition which it has always been difficult to achieve when targeting broad money aggregates which contain a high proportion of interest-bearing deposits whose returns move with other short-term rates. Where financial innovation has led to the payment of interest on sight deposits this condition is hard to achieve even for narrow money aggregates.

## Box 15.2 The Bundesbank cuts interest rates

Surprise over size of reduction aimed at boosting German economic recovery

## Bundesbank cuts repo rate to 3%

### Bundesbank rate cut is welcomed in France but not by holders of D-Marks



Source: FT Extel.

By Andrew Fisher in Frankfurt, David Owen in Paris and Richard Adams in London

The Bundesbank yesterday cut one of its key interest rates more sharply than expected in an apparent bid to reinforce the German economic recovery and help support the shaky French franc.

The German central bank lowered its securities repurchase (repo) rate, through which it influences the money market, from 3.3 per cent to a new low of 3 per cent, citing slower growth in the

money supply as the main reason for the move.

European share and bond prices moved ahead on the news and the dollar strengthened against the D-mark.

In London, news of the Bundesbank's decision was greeted with shouts of surprise on trading floors.

The Bank of France quickly followed, cutting its intervention rate by 0.2 of a percentage point to 3.35 per cent.

Last month, President Jacques Chirac criticised the management of France's banking system and said

French and German interest rates were 'clearly too high'. His remarks are widely believed to have contributed to this month's depreciation of the franc.

Yesterday, the French currency and the Paris stock market responded favourably to the reductions. The franc rose strongly against the D-mark, to FFr3.409 at close of trading in London, from FFr3.421 on Wednesday.

The benchmark CAC-40 index closed ahead 0.86 per cent at 2,017.87, recouping virtually all the ground lost the previous day.

September PIBOR contracts, which show the level of French interest rate expectations, rose to 96.07, up 31 basis points on the day. At this level dealers expect French interest rates to be about 3.93 per cent next month.

A repo rate cut had been expected after the Bundesbank took no action at its last council meeting in July, but most economists and traders had expected a cut to around 3.2 per cent. Several economists thought further repo cuts and even a lower discount rate – currently 2.5 per cent – were now possible.

The article above is taken from the *Financial Times*, Friday, 23 August 1996, and reports the decision by the *Bundesbank* (in the pre-ECB era) to reduce its official dealing rate from 3.3 per cent to 3 per cent. There are three points of general interest illustrated here. The first is that the reduction in interest rates raised share and bond prices. We saw earlier in this chapter that if interest rates fall the price of money market instruments increases. Since these instruments are to some extent substitutes for shares and bonds, we must expect them to move in the same direction. Secondly, we should note that the article stresses the unexpected nature of the reduction. If it had been expected, it would already have been incorporated in prices and would have had little or no effect when announced. Thirdly, notice how quickly an event in German markets has an impact across the world. The US\$ and the Ffr strengthen against the DM; the Bank of France cuts its official dealing rate; share prices rise throughout Europe.

**Table 15.2** Instruments used in central bank operations

	ECB	UK	USA
Outright purchase	GS, CP <sup>1</sup>	GS	GS
Outright sale	GS, CP	GS	GS
Repurchase	GS, CP	GS, CP	GS
Matched sale and purchase	–	–	GS

<sup>1</sup> GS = government securities (including treasury bills);  
CP = commercial paper (including commercial bills).

Source: *The Conduct of Monetary Policy in the Major Industrial Countries: Instruments and Operating Procedures*, Washington, DC: International Monetary Fund (Batten, D.S., Blackwell, M.P., Kim, I.S., et al., 1990); and *Monthly Bulletin*, various issues, Frankfurt am Main, European Central Bank (ECB, undated), information can be obtained free of charge from the ECB, in particular from [www.ecb.int](http://www.ecb.int)

The fundamental source of its power, as we said in Sections 6.4 and 12.5, is that the central bank is the monopoly supplier of liquidity in the event of a system-wide shortage. Furthermore, the facilities for exploiting this power are very similar in money markets throughout the world. By comparison, the differences between operating techniques are fairly trivial. Table 15.2 shows the instruments through which selected central banks conduct their open market operations and the similarities are obvious.

Table 15.3 shows the interest rates that the same selected central banks try to influence via these operations. Careful inspection of the final column shows that it is essentially the same range of short-term rates that central banks seek to influence.

We noted above that there has been a convergence of operating procedures in recent years towards open market operations. Both the reasons for this, and the institutional changes necessary to bring it about, vary from country to country. In the USA and the UK the changes were small. In Italy and France the necessary changes were considerable but for Germany rather less. The general principle underlying the shift has been the move towards less direct regulation of markets. When market participants are free to operate with few constraints, direct controls are fairly easily circumvented. Where this is not possible, the controls impose a cost on the service which drives clients elsewhere, a freedom again which comes with deregulation. Recent developments in France provide a useful illustration, though a very similar picture could be drawn based on the UK in the late 1960s.

Before 1985, the French financial system was highly segmented, with each segment regulated by a different authority and largely by administrative decree. This was because with borrowers and lenders confined to their own specified segment, there was no mechanism (arbitrage or competition, for example) whereby the effect of central bank money market operations could be transmitted generally through the rest of the system and also because, before 1985, there were anyway no money market securities through which the *Banque de France* could conduct open market operations. This, in turn, meant that monetary policy had to be implemented separately in each segment and this required the development of quantitative rules and guidelines for the quantity and distribution of credit for each segment.

**Table 15.3** Official and key money market interest rates

Rate	Description	
ECB	Refinancing rate	Rate charged by ECB on repos and outright purchases of eligible assets (mainly government securities)
United Kingdom	Bank of England dealing rates	The rates at which the Bank of England conducts bond and bill repos
United States	Discount rate	Rate charged by the Federal Reserve on short-term lending to depository institutions
	Federal funds rate	Rate charged in the interbank market for lending between depository institutions

Source: *The Conduct of Monetary Policy in the Major Industrial Countries: Instruments and Operating Procedures*, Washington, DC: International Monetary Fund (Batten, D.S., Blackwell, M.P., Kim, I.S., et al., 1990); and *Monthly Bulletin*, various issues, Frankfurt am Main, European Central Bank (ECB, undated), information can be obtained free of charge from the ECB, in particular from [www.ecb.int](http://www.ecb.int)



**More from the web**  
**Bundesbank money market operations**

An interesting explanation of how a national central bank in ESCB uses its domestic money markets to implement the decisions of the ECB is contained in the *Annual Reports of the Bundesbank*.

These, and the *Monthly Reports*, are available on the *Bundesbank's* website: [www.bundesbank.de](http://www.bundesbank.de) From the home page, click on 'Economics' and then on 'Annual Report'. The activities are described in a chapter headed 'Operations of the Deutsche Bundesbank'.

There were several reasons for change. Firstly, as we noted earlier, where these controls are effective they impose a cost. As financial markets elsewhere were liberalized, it became both easier and cheaper for French corporations to raise funds outside France. This would clearly become a bigger problem as national barriers to monetary and financial activity were removed in the cause of further European integration. Furthermore, and this was a perfect repetition of the UK experience in the 1960s, direct regulation encourages firms to set up at the margin of the regulations. The target of any regulation has to be defined with precision. Once defined, it is an invitation to those who wish to circumvent it to develop an activity which falls just outside. The result then is that the regulations (and their bureaucracy) either have continually to expand or become ineffective. Finally, when the EMS was established in 1979 and the French authorities committed themselves to stabilizing the franc within it, they required a mechanism capable of reacting quickly enough and with sufficiently broad effects to fluctuations in the external value of the franc. The only mechanism that would operate in a sufficiently widespread and non-discriminatory way was the level of short-term interest, provided, of course, that interest rates in one segment were free to influence interest rates in another. Substantial structural changes to French financial markets were undertaken in 1985 and the move towards a monetary policy based on money market intervention began.

The move from discount window lending to open market operations represents a further step along the same road towards market liberalization. Lending via the discount window requires the authorities to advertise or 'post' a rate of interest at which it will

provide assistance. The authorities are therefore clearly setting short-term rates. There is, firstly, a technical question about whether they are in a position to make the correct judgement about the rate necessary in a particular situation. They may, for example, judge that economic conditions require a rise in interest rates of 50 bps, but raising their lending rate by 0.5 per cent will not *necessarily* cause market rates to rise by the same amount if they have underestimated the degree of liquidity in the market. But in some countries there has been a 'political' problem too. Announcing an official discount rate makes the authorities visibly responsible for the setting of interest rates. In systems like the UK, France and Italy where the central bank was accountable to elected governments, there was sometimes a reluctance to change rates (particularly to raise them) when economic circumstances require. Open market operations give the authorities freedom to exploit the markets' own perception of the shortage/surplus of funds and, less convincingly, to claim that interest rate changes are the result of market forces.

With the movement to independent central banks, it has become unnecessary to disguise who sets interest rates. The Bank of England's current (i.e. post-1997) money market operations are now fairly typical.

The Bank makes twice-daily forecasts of the money markets' likely liquidity position. Since the system tends to expansion, the forecasts tend to show a shortage of liquidity. Given the forecast shortage, the Bank states that it is willing either to make outright purchases of assets and/or enter into repo agreements up to the amount of the forecast shortage for a short dealing period after each forecast is announced. The assets in which it makes outright purchases are treasury bills and 'eligible' (see Section 15.3) bank and local

**More from the web**  
**UK money markets**

The day-to-day issue and redemption of treasury bills in the UK is in the hands of the recently created Debt Management Office. The DMO's website has a feature which explains how it manages the government's short-term financing requirements and how it deals in the UK money markets. The site also provides statistical information on treasury bill tender prices and yields. On the DMO's home page, click on 'money markets'.

The website is: [www.dmo.gov.uk](http://www.dmo.gov.uk)

authority bills. Repo agreements can be based upon the same bills or, more usually, government bonds. In order to deal with the Bank as ‘counterparties’, institutions have to meet certain criteria and enter into an agreement giving them certain obligations to be willing always to provide any short-term finance that the government may require. In practice, the Bank deals with most licensed UK banks and building societies.

The assets in which transactions take place are invariably very short term. In the case of outright purchases, the residual maturity will normally be less than 14 days. In the case of repos, the repo agreement will normally be for less than 14 days, though the bonds forming the collateral may have a residual maturity of anything longer than the repo itself. These assets form a very useful second line of highly liquid ‘near-reserves’ for banks. They earn interest (which cash and balances at the Bank do not) and yet they can be exchanged for cash and balances at a moment’s notice through these official deals when necessary. They are an essential buffer stock which enable banks to adjust to liquidity shortages/surpluses.

In announcing its willingness to make outright purchases (engage in repos) the Bank is normally expressing its willingness to do so at the going rate. Ignoring emergencies, the exception to this arises once a month following the meeting of the Monetary Policy Committee. If the MPC decides that interest rates should change, the new rate operates with effect from the next dealing period. Since the Bank’s official dealing rate is setting the price of a key source of marginal funds for banks, its immediate effect falls upon interbank rates which change immediately. Since, as we have seen, many other rates are set by reference to LIBOR, these change automatically. Those that are not linked ‘administratively’ change rapidly as possible arbitrage opportunities emerge.

## 15.5 The Eurocurrency markets

In the introduction to this chapter we noted that most of the instruments we were going to analyse as part of money market transactions existed in both a domestic currency form and a ‘Euro-’ currency form.

A Eurocurrency instrument is in fact any instrument denominated in a currency which differs from that of the country in which it is traded. Thus it follows that ‘Euro-’ instruments can be found all over the world and have no obvious connection whatever with Europe. The ‘Euro-’ prefix is just a reminder that the practice of trading instruments denominated in foreign currencies began with the US dollar being traded in Europe. Since dollar deposits first began to be held in European banks in the late 1960s, the Eurocurrency markets have grown very rapidly, the stock of Eurocurrency assets being estimated by 1995 at over \$6,000bn. In the 1980s alone they expanded over threefold. The Eurocurrency markets predate the markets for Eurobonds (which we discuss in the next chapter). We look firstly at the factors behind the growth of Eurocurrency instruments<sup>6</sup> and then at some of the possible consequences.

Under the Bretton Woods system of fixed exchange rates established after the Second World War, the US dollar functioned as an intervention currency, an international means of payment and store of value. The worldwide demand for dollars was met by a combination of US balance of payments deficits and dollar borrowings from US banks, the resulting deposits being held until the early 1960s, mainly with US banks. In the mid-1960s, however, the US authorities began to impose controls on currency outflows which limited access to these (US-stored) deposits for overseas owners. This combined with two further, long-running, disadvantages. The first was ‘Regulation Q’ which limited interest payments on deposits. The second, mainly relevant to Eastern bloc countries, was the risk that dollar deposits might be impounded for political reasons. The result was that non-US owners of dollar deposits began to place them with European banks and, later, with European subsidiaries of US banks.

Since reserve, deposit insurance, capital and other regulatory requirements are usually imposed with respect to banks’ holdings of deposits in the domestic currency and act as a tax on deposit business, a further contributory factor to the long-term growth of Eurocurrency business was the ability of Eurobanks to offer their services at more competitive rates than domestic institutions. ‘Eurobanks’ is actually something of a misnomer. Most are departments or subsidiaries of major banks with a clear national identity.

<sup>6</sup> Readers may care to note the similarities between the forces driving the growth of Eurocurrency activity and those behind the growth of the Eurobond markets. The latter are listed in Box 16.7. The role played by regulation is particularly striking in the two cases.

Most countries are involved, although the largest shares lie with banks whose headquarters are in Japan or the USA.

When we come to look at the consequences of Eurocurrency development, it should be said immediately that there is nothing fundamentally different between a bank that specializes in Eurocurrency business and a bank that concentrates on domestic deposits and lending, from an economic point of view. Both help channel funds between surplus and deficit units and, in so far as they create assets and liabilities which are more attractive to end users than would be the case if the latter dealt directly with each other, they help to mobilize funds which might otherwise have lain

idle. However, there are two possible consequences of Eurobanking activity which have attracted considerable attention.

The first is the effect upon world money supply and liquidity. If, as we said above, Eurobanks are able to mobilize funds which would otherwise lie idle (through the usual processes of maturity and risk transformation) then private sector liquidity is increased. Furthermore, if we introduce into the banking system a further layer of institutions whose liabilities are money, as is plainly the case with any Eurocurrency, then we introduce the possibility of further multiple deposit creation against a limited quantity of reserves. Most Eurobanks hold reserves with major US banks

### Box 15.3 Money market flows

The following flows will cause changes in money market liquidity. The headings used are the terms employed in *Financial Times* money markets reports for the UK. The explanations, however, are written in general terms, applicable to any money market. In each case, the event is described in such a way that it produces a *reduction* in liquidity to which the central bank will have to respond by supplying additional funds in whatever quantity and at whatever price it thinks appropriate.

#### ■ *Exchequer transactions*

- net payments to the exchequer  
If the government banks with the central bank (as it does in the UK), then net payments to government by the private sector will lead to a transfer of funds from banks' balances at the central bank into government accounts.
- net official sales of gilts  
The net purchase of government bonds by the private sector is just one way in which net payments may be made to government with the money market consequences described above.
- net receipts of sterling on the Exchange Equalization Account  
If the central bank intervenes to support the domestic currency, it sells foreign currency in exchange and thus drains the market of the domestic currency.

#### ■ *Change in the note issue*

When the public makes net withdrawals of banknotes, retail banks replenish their holdings of notes from the central bank which debits their balances accordingly.

#### ■ *Bills maturing in official hands/sales of treasury bills*

When bills (or other instruments) held by the central bank mature, payments flow to the central bank from those who issued the bills. The purchase of treasury bills (or other government debt) by money market institutions also causes a flow of funds from the market to the central bank.

#### ■ *Unwinding of previous assistance*

Previous assistance given by the central bank to the market, a repo deal for example, will be for a fixed period. At the end of that period market institutions will have to repay the loan or repurchase the bills and this requires a flow of funds from the market to the central bank.

#### ■ *Bankers' balances below target*

If the previous day's clearing has left banks' balances at the central bank below their desired level, banks will withdraw funds lent in the money market.

or with major banks operating in the domestic monetary system. Imagine, for example, that a US resident moves dollars from a domestic bank to a Eurodollar bank. In the domestic bank, there is a rearrangement of ownership of deposits (from a non-bank to the Eurobank). In the Eurobank, there is an increase in customer deposits matched, of course, by an increase in reserves. However, the bank's liquidity has increased (on the assumption that its reserve:deposit ratio is less than one). If its response is then to increase its advances and if those advances are redeposited, then a further expansion of the Eurobank's balance sheet is possible. Numerically at least, the significance clearly depends upon two ratios,  $r$ , the reserve ratio and  $d$ , the re-deposit ratio. The multiplier will take the value:

$$\frac{1}{1 - d(1 - r)} \quad (15.9)$$

Estimates of the size of the Eurodollar multiplier range widely from the very high figure of 18.4 down to 1.15. Part of the explanation for the wide range of estimates lies in the difficulty of identifying reserves held against Eurodollars in Eurobanks which are branches of domestic US banks. The reserves held by the parent bank do not distinguish between the types of deposit against which they are held.

A second consequence, or group of consequences, arises from the increasing difficulty of operating an independent domestic monetary policy. Clearly, any attempt to control domestic monetary expansion can be partially thwarted at least by frustrated UK borrowers taking out Eurodollar (for example) loans and exchanging the proceeds for spot sterling. Such would be a predictable response whether the monetary restrictions came in the form of higher interest rates or some form of MBC. Furthermore, high UK interest rates, which would be part of a restrictive monetary policy, may attract an inflow of Eurocurrencies which

could then be exchanged for sterling at a guaranteed price (under fixed exchange rates), increasing both the money supply and UK banks' cash reserves. In principle such an inflow can be sterilized by sales of securities but there is the obvious danger that security sales themselves widen the gap between domestic and Eurocurrency interest rates, leading to an increased inflow. With floating exchange rates it is the exchange rate itself that has to adjust.

## 15.6 Summary

Money markets enable lenders and borrowers to trade short-term funds. Some markets consist of negotiable securities which can be bought and sold between third parties while others are deposits which can be extinguished only by withdrawal. Since it would make no sense to arrange for interest payments on very short securities, these are usually issued at a discount to their par or maturity values. This means that comparisons between the yields on different money market instruments are not directly comparable. Rates of discount have to be converted to equivalent yields.

The markets are used overwhelmingly by large corporations and by government. The minimum denominations of instruments are very large and trading and trades take place at very 'fine' margins, measured in basis points. However, the personal sector can get access to money market rates of return via a number of indirect routes which require the creation of mutual funds by an intermediary.

From an economic policy point of view, the most important feature of the money markets is that central banks play a dominant role which they can exploit when they wish to change the level of short-term interest rates.

### Key concepts in this chapter

Money markets  
Capital markets  
Yield basis  
Discount basis  
Basis points  
Spreads

Rate of discount  
Equivalent yield  
Striking price  
Bid price  
Money market mutual fund  
Open market operations

## Questions and problems

- 1 Distinguish between ‘money’ and ‘capital’ markets. In what circumstances might (a) lenders and (b) borrowers abandon their usual preferences?
- 2 Why are the interest rate spreads between money market instruments generally very small?
- 3 Why does the yield on a discount security exceed the discount rate?
- 4 Which of the following offers the highest return:
  - (a) A three-month bill with a discount rate of 8 per cent?
  - (b) A three-month NCD with an interest rate of 8.25 per cent?
  - (c) A six-month bill with a discount rate of 8 per cent?
  - (d) A six-month NCD with an interest rate of 8.25 per cent?
- 5 The yield on 30-day commercial paper is 7 per cent. What is its discount rate?
- 6 Who are the main participants in money markets?
- 7 Explain briefly how the monetary authorities might intervene in the money markets in order to influence the growth of money and credit.
- 8 Discuss the proposition that the monetary authorities can control either short-term interest rates or the quantity of bank reserves, but not both.
- 9 How does economic theory suggest that the authorities should choose between an interest rate target and a reserves quantity target?

## Further reading

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#### Websites

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[www.bundesbank.de](http://www.bundesbank.de)

[www.dmo.gov.uk](http://www.dmo.gov.uk)

## Chapter 16

# Bond markets

### *What you will learn in this chapter:*

- The main characteristics of bonds
- How they are priced and how yields are calculated
- Why yields vary between bonds of different maturities
- How these yield differences may be used to obtain information about future interest rates
- The main participants in the bond markets
- The size, growth and recent development of these markets

## 16.1 Introduction

By contrast with bills, and the other money market instruments that we met in the last chapter, the issue of bonds provides a long-term source of funds. Even the shortest-dated bonds have an initial maturity of more than one year, though most, as we shall see, have much longer lives when they are initially issued. Traditionally, bonds offer a fixed rate of interest and bondholders usually have a claim on the issuer which comes before other creditors (such as shareholders, for example) in the case of the issuer's bankruptcy. Bonds issued by governments and large corporations who are unlikely to default are therefore regarded as relatively safe investments.

However, most bonds also have a fixed nominal value. This has meant that their real value has often been sharply eroded by inflation. Indeed, we shall see later that bond markets are very sensitive to any event which appears to foreshadow higher inflation, prices fluctuating sharply and inversely with changes in inflation expectations. This means that bondholders are exposed to capital risk if they do not intend to hold the bonds to redemption. The high and variable rates of interest and inflation of the 1970s and 1980s led many bond markets to experiment with innovations such as index-linked and variable rate bonds.

The biggest innovation of all in recent years, however, has been the massive growth in the **Eurobond** market. As we saw with the money markets, instruments can be issued in the currency of the country in which they are traded ('domestic' instruments) or, increasingly, they can be issued in the currency of another country. Yen-denominated bonds issued in London, for example, or HK\$-denominated bonds issued in Frankfurt are all known as Eurobonds.

In this chapter we begin by looking in more detail at the types and characteristics of bonds available. In Section 16.3 we then look at the different meanings that can be attached to the term 'yield' as it applies to bonds and at the mathematics of bond yield calculation. This naturally requires us to consider the pricing of bonds, to which we had an introduction in Sections 11.3 and 11.4. Section 16.4 looks at the types of risk to which bondholders are exposed and at the work of the risk-rating agencies. Section 16.5 examines the term structure of interest rates while Section 16.6 looks at the users of bond markets, borrowers and lenders, and at some of the institutional features of bond markets and trading. One of the major developments of recent

years has been the rapid growth of international bond markets. Although international bonds share many of the characteristics of domestic bonds, and are priced and traded in similar ways, we have chosen to deal with this particular development, in order to emphasize its dramatic expansion, in a separate section, 16.7. Section 16.8 summarizes.

## 16.2 Bonds: types and characteristics

As we said at the outset, bonds are traditionally fixed interest, long-term securities. 'Long-term' means at least a year, though many are issued with an initial maturity of 20 years or more. For purposes of reporting prices and yields, bonds are often classified by time to maturity but what matters, of course, is the length of time to maturity *from now*, that is, what matters is **residual maturity**.

The classification commonly used is:

- <5 years' residual maturity: 'shorts'
- 5–15 years' residual maturity: 'mediums'
- >15 years' residual maturity: 'longs'

In the UK there are six issues of 'undated' government bonds dating from the 1914–18 war.

All bonds are issued with a **par value**. This is the price at which they will be redeemed at maturity. This is not necessarily the price at which they are issued – they may be issued at a discount or premium to their par value. In the UK, the par value is £100, in the USA \$1,000, in Germany €100. Conventional bonds pay a fixed amount to their holders at set intervals throughout their life. This amount is set in absolute terms and is known as a **coupon**, for reasons we shall see in a moment. It is a simple task to convert the coupon to a **coupon rate**, by dividing by the par value. Thus a UK bond that paid a £5 coupon per year, or a German bond that paid €5 per year, would both have coupon rates of 5 per cent, and would be referred to as '5 per cent bonds'. Notice that if an investor does happen to buy the bond when its price is equal to its par value and holds it to redemption, then the yield to the investor is also 5 per cent. The investor invests £100 and receives £5 per year until his or her outlay is returned. The characteristics we have so far listed are usually all included in the name or title of a bond. Thus, for example, we may see:

Electricité de France 8<sup>3</sup>/<sub>4</sub>% 2022



or

Treasury 9% 2008

The title of the former bond indicates that it will pay £8.75 per annum until the year 2022, when it will be redeemed at its par value, while the latter will pay £9 per annum until 2008, when it too will be redeemed. Box 16.6, later in this chapter, features a table from the *Financial Times*, listing UK government bonds identified by coupon and redemption date.

As a general rule, the ownership of domestic bonds is ‘registered’, that is to say that the issuer of the bonds maintains a register of current owners and pays them the coupon when it falls due. (In the UK, US and Italy, most coupons are paid in two equal, six-monthly instalments, though a minority are paid annually or quarterly. In France, Germany and the Netherlands annual payments are the norm.) However, some domestic bonds and most Eurobonds are **bearer bonds**. That is to say that there is no register: possession of the bond itself is proof of ownership. Owners of bearer bonds claim their interest payments by detaching the appropriate coupon supplied attached to the bond and sending it to the issuer at the appropriate time. The universal use of the term ‘coupon’ for the interest payment dates from the time when all bonds were bearer bonds. Occasionally, one comes across **zero coupon bonds**. These are bonds which pay no interest but must then be issued at a discount to their redemption value in order to provide a return to investors in the form of capital appreciation. Thus, zero coupon bonds are simply long-dated versions of the bills we analysed in Chapter 15. In recent years, markets have developed for what are known as *strips*. Each strip is the single component cashflow of a bond (usually a government bond) traded separately. Hence, for example, a 5 per cent bond maturing in four years’ time could be traded as nine separate strips (eight coupon payments, each with a different maturity plus the maturity value of the bond payable at the end of its life). Each of these would be traded as a zero coupon (‘deep discount’) bond, maturing on the appropriate date. The advantage of zero coupon/deep discount bonds is twofold. Firstly, their return comes effectively in the form of a capital gain and for some investors there are tax advantages in receiving a capital gain rather than a series of income payments. Secondly, because no coupons are paid, the ‘duration’ of a strip is always equal to its residual maturity. Strips will thus be particularly attractive for investors who

wish to take a position in bonds based upon an expectation that interest rates are likely to fall. (Duration and its relevance to bond price behaviour is discussed in Section 16.4.2 below.) Bonds with the traditional characteristics that we have just described are sometimes known as **straight**, or **plain vanilla** or **bullet bonds**, to distinguish them from the more recently developed variants which we come to shortly.

Bonds are issued by governments and by large financial and non-financial firms. Where public corporations, such as SNCF or *Deutsche Bundesbahn*, issue bonds these generally share the characteristics of, and are classified with, government bonds. As a rule, (private) corporate bonds show a greater degree of variation in their characteristics than do bonds issued by the public sector. We return to this in a moment.

As with money market instruments, the terminology used in different countries is not always helpful, terms for ‘bills’ and ‘bonds’ tending sometimes to merge at the margins.

The terminology of bonds issued by private sector institutions can also pose a problem. The most general term, covering all types of bonds issued by private firms, is **corporate bonds**. Within this category, however, are

**Table 16.1** Government bond terminology

France	<i>Obligations Assimilable de Trésor (OATS)</i> <sup>1</sup>
Germany	<i>Bundesschatzanweisungen</i> (2–4 years initial maturity) <sup>2</sup> <i>Bundesobligationen</i> (5 years initial maturity) <i>Bundesanleihen</i> (10–30 years initial maturity)
Italy	<i>Buoni del Tesoro Poliennali</i> (2–10 years initial maturity, fixed rate) <i>Certificati Credito del Tesoro</i> (2–10 years initial maturity, variable rate) <i>Certificati del Tesoro con Opzione</i> (6 years initial maturity with 3-year redemption option)
UK	Government bonds or ‘gilt edge’ (‘gilts’)
US	Treasury notes (1–7 years initial maturity) Treasury bonds (>7 years initial maturity)

<sup>1</sup> Note that the French government also issues 2- and 5-year bonds which it calls ‘*Bons de Trésor à Interêt Annuel*’ or ‘*BTANS*’. ‘*Bons de Trésor*’ is also the term used for ‘bills’ – see Chapter 15.

<sup>2</sup> All known colloquially as ‘*Bunds*’.

a number of subdivisions. These arise mainly from differences in the claim on a firm's assets which the bond gives to bondholders, rather than in the financial characteristics of the bond (though the claim on assets naturally affects the risk and therefore the yield attaching to the bond).

**Debentures** are a subset of bonds which are secured on the assets of a firm. They may be secured by a *fixed charge* on specific assets or a *floating charge* on the firm's assets in general. Fixed-charge debenture holders rank above floating-charge debenture holders but it is the floating-charge debenture holders (in the UK) who have the power to ask for a firm to be declared insolvent.

Corporate bonds with no charge over a company's assets are known as *unsecured loan stocks* while those bonds guaranteed by a third party, most usually the parent company or group to which the issuer belongs, are known as *guaranteed loan stocks*. When it comes to risk, guaranteed loan stocks would normally be ranked better (that is, lower risk) than unsecured loan stocks, but behind floating-charge debentures which in turn rank behind fixed-charge debentures. Again, all of these bonds can offer the traditional characteristics of vanilla or bullet bonds, or they may involve one or more of the additional characteristics listed below.

Some corporate bonds are **convertibles**. In addition to the normal characteristics of a bond, they carry the option to convert at some point in the future either to other types of bond issued by the firm, or more usually to its equity. Other corporate bonds with options attached to them are *callable* or *puttable bonds*, meaning that their redemption date can be decided later at the discretion of the issuer (callable) or the holder (puttable). Some corporate bonds (and some government bonds too) are *double-dated*. That is, their redemption can take place (at the issuer's discretion) at any time between two dates, which are usually included in its title.

As a result of the high and variable inflation rates of the 1970s and 1980s some corporate and government bonds are **index-linked**. This means that their par value is uprated periodically in line with a price index and that the coupon payment is also increased by the amount of the recent change in the index. The same conditions gave rise to bonds that pay a coupon which is adjusted in line with some other, usually short-term, interest rate. For some reason, such bonds issued by the public sector are known as *variable rate bonds* while their corporate counterparts are known as **floating rate notes**.

*Preference shares* have characteristics which place them between bonds and equities. We discuss them in Chapter 17, when we examine company shares.

**Eurobonds** are bonds issued in a currency which is not the currency of the country of issue. The Euro-bond market has been the most innovative of all bond markets and we look at it later in Section 16.7. Eurobonds should not be confused with **foreign bonds** – bonds denominated in domestic currency but issued in that country by non-residents. In London, for example, foreign firms may issue **bulldog bonds**, denominated in sterling, while UK firms may issue *yankee bonds*, denominated in dollars, in the USA.

### 16.3 Bond prices and yields

We already know enough about financial assets to appreciate that the yield on a bond is going to be determined to a large extent by the price that we pay for it and the periodic 'coupon' payment that we receive from the issuer of the bond. While this is true, there are some other considerations which we have to take into account. For each of the additional factors that we take into account, we have a rather different meaning of the term 'yield'. Worse than this, not only do we have different definitions of yield, but 'price' itself has two meanings when we discuss bonds. We look at price first.

In Section 11.3.2 we saw that the valuation formula for a fixed interest stream is:

$$P = \sum_{t=1}^n \frac{C_t}{(1+i)^t} + \frac{M}{(1+i)^n} \quad (16.1)$$

or alternatively:

$$P = \frac{C}{i} \left[ 1 - \frac{1}{(1+i)^n} \right] + \frac{M}{(1+i)^n} \quad (16.2)$$

We also know that if we set  $n = \infty$ , then Equation 16.2 reduces to:

$$P = \frac{C}{i} \quad (16.3)$$

However, all three formulae suffer from two important simplifications. Firstly, they assume that coupons are paid annually, while in practice most are divided into two equal instalments which are paid at six-monthly intervals. (A few pay coupons in four, three-monthly,

instalments). The second is that the coupon is paid on a set date while deals can be struck on any day of the year and therefore some way has to be found of taking account of the interest that has accrued to the seller but will be received by the buyer after the deal has taken place. Taking coupon intervals first, if coupons are paid six-monthly, then Equation 16.2 should be modified to:

$$P = \frac{C}{i} \left[ 1 - \frac{1}{\left(1 + \frac{i}{2}\right)^{2n}} \right] + \frac{M}{\left(1 + \frac{i}{2}\right)^{2n}} \quad (16.4)$$

We turn now to the question of accrued interest. Imagine a bond with semi-annual coupon payments. One might buy it, for example, just after a coupon payment, and thus wait nearly six months for the next; or one might buy it with only two months to go to the next coupon payment. If we were to pay the same price for the bond in both cases, then clearly the yield would be lower in the former case (where we get the coupon after six months' waiting) and higher in the latter (where we get the same income after only a short wait). Everyone would wish to hold the latter bond and there would be no market for the former. In practice, of course, the market prices the long-wait bond below the short-wait one, with two consequences. Firstly, the yields are made equivalent by the different prices offsetting the different waiting periods; secondly, the market price of bonds varies cyclically with the length of wait to the next coupon payment. If everything else is unchanged over the year, a bond's price will follow the pattern shown in Figure 16.1.

The increase in the price between each coupon payment date,  $C_1$  and  $C_2$  for example, represents **accrued interest**. Accrued interest is that fraction of the coupon payment which has been 'earned' since the last payment date.

$$AI = \frac{C}{2} \left( \frac{n_{lc}}{182} \right) \quad (16.5)$$

In Equation 16.5,  $AI$  stands for accrued interest and  $n_{lc}$  is the number of days since the last coupon payment. The market price, incorporating accrued interest, is also commonly known as the **dirty price**, meaning that the price, which one usually explains by reference to other, more interesting, variables, is, additionally, contaminated by the position of the bond between its coupon payment dates.

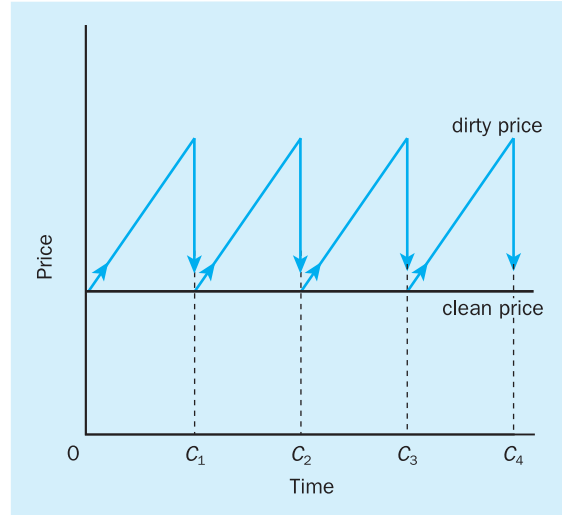


Figure 16.1 Clean and dirty bond prices

The dirty price can be contrasted with the bond's **clean price**, where the effect of accrued interest is ignored. In most countries, the price actually quoted for bonds – in the financial press and on trading exchanges – is the clean price. However, when the bond is traded it is understood that a buyer will pay to a seller the clean price, plus an amount of accrued interest which is the seller's share of the coupon payment which will later be paid to the new owner.

The formulae that we have used so far ignore accrued interest and therefore, by implication, they are the formulae one would use if pricing the bond immediately after a coupon payment. They are the formulae that one would use for the clean price. Combining Equations 16.4 and 16.5 gives us a formula for finding the dirty price of a bond paying coupons twice a year and including any accrued interest. This is:

$$P = \frac{C}{i} \left[ 1 - \frac{1}{\left(1 + \frac{i}{2}\right)^{2n}} \right] + \frac{M}{\left(1 + \frac{i}{2}\right)^{2n}} + \frac{C}{2} \left( \frac{n_{lc}}{182} \right) \quad (16.6)$$

One might well wonder why this complication is necessary. There are essentially two reasons, one analytical and the other distinctly practical. The first, we have touched on. Bond prices fluctuate for a number of reasons. We shall see in a moment that the main cause is changes in market interest rates, but inflationary expectations and risk also play a part. Changes in

these variables cause large changes in bond prices and they are irregular and hard to predict. Thus, these are the interesting variables for bond analysts and they act upon the clean price. The fact that the **market price** also varies continuously as a linear function of the period to the next coupon payment is a mere mathematical necessity. It is of very little interest and thus, as we said above, it ‘contaminates’ the interesting picture. The practical reason for the distinction lies with taxation. In many tax systems, income is taxed differently from capital gains. A rise in market price resulting solely from the accrual of interest is in effect the result of the coupon or income payment and should be taxed as income. By contrast, an increase in the bond’s clean price for other reasons is a change in its capital value and should be taxed as capital gain.

Before we leave the issue of price, there is one further complication. We said a moment ago that the market or dirty price included accrued interest which represented the seller’s share of the coupon payment which would be paid in full to the buyer, even though the buyer may not have held the bond for very long. A moment’s thought should suggest that it is not administratively practical, in the case of registered (as opposed to bearer) bonds, to make coupon payments to the buyers of bonds who buy the bonds only a few days before the coupon payment date. It takes time for the registrar’s office to record a change of ownership and to organize payment to hundreds of thousands of bondholders. There is thus a ‘cut-off’ date for sales, after which the next coupon payment will go to the previous, rather than the new, owner. After the cut-off date the bond is said to trade **ex dividend**, meaning without the benefit of the coupon payment. This means, of course, that the new owner will have to hold the bond for *more than* six months before receiving a coupon. During this period, instead of the dirty price being made up of the clean price *plus* accrued interest, the market price will actually lie *below* the clean price.

Figure 16.2 shows the situation. If nothing else changes, the clean price is constant throughout the year. The market price, however, fluctuates as we saw in Figure 16.1. The clean and dirty prices are equal on the coupon date, C. After the coupon payment date, the dirty price accumulates accrued interest. During this period the buyer will get the whole of the next coupon payment and is therefore compensating the seller by passing a share of it to him or her. The accrual of interest (and the increase in the dirty price)

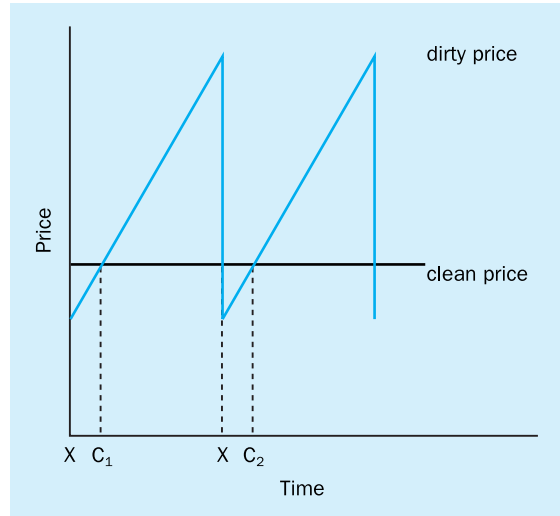


Figure 16.2 The effect of ex-dividend dates

continues to the ex-dividend date, X, after which the next coupon payment goes to the seller. In these circumstances, the compensation must flow from seller to buyer. This happens when the dirty price drops overnight and buyers can buy at a price below the clean price until the next coupon payment date. The formula for accrued interest now becomes:

$$AI = \frac{C}{2} \left( \frac{n_{xt} - n_{xc}}{182} \right) \tag{16.7}$$

where C is the coupon payment,  $n_{xt}$  is the time in days since the last ex-dividend date and  $n_{xc}$  is the time in days from the last ex-dividend date to the next coupon payment.

Notice that the numerator of Equation 16.7 may be either positive or negative, depending on the date on which the calculation is done. In the illustration in Box 16.1, the numerator is positive and so there is a fractional *addition* of interest (0.56 of £4) to the clean price. The seller is being compensated for not receiving the coupon even though he had held the bond 56 per cent of the coupon period. But it is quite possible for this fraction to be negative. If we were thinking to buy the same bond on 11 November, for example, we should find that the fraction is  $-0.1$  ( $(11 - 30) / 182$ ). In this case, the clean price would be *reduced* by £0.40p ( $-0.1 \times £4$ ). This is because the coupon payment of £4 will go to the seller and the buyer needs compensation for holding the bond but not receiving the next coupon.

**Box 16.1 Bond prices and accrued interest**

Imagine a plain 8 per cent £100 bond which pays its coupon in equal half-yearly instalments on 1 June and 1 December each year. Suppose further, only for simplicity, that it has a long residual maturity and that long-term interest rates are 8 per cent. Its clean price will be £100 and this will also be the dirty or market price on 1 June and 1 December, when there is no accrued interest to take into account. Now let us assume additionally that the bond goes 'ex dividend' 30 days before the coupon payment date. If it is now 10 September, we can calculate the accrued interest using Equation 16.2.

Firstly, the relevant coupon payment will be:

$$C/2 = £8/2 = £4$$

The number of days between the ex-dividend date and the coupon payment date is 30 days (by assumption) and so:

$$n_{xc} = 30$$

The number of days between now and the last ex-dividend date is 132 (= 2 May–10 September) and so:

$$n_{xt} = 132$$

Substituting these values into Equation 16.2 gives:

$$AI = 4\{(132 - 30)/182\} = 4(0.56) = 2.24 \text{ or } £2.24\text{p}$$

On 10 September, therefore, the market or dirty price of this bond will be £102.24p.

*Exercise*

Find the market price of this bond on 11 November, assuming nothing else has changed. (The answer is in the text.)

It is obviously important for traders to know whether the quoted price is the clean or dirty price, but we shall see now that the distinction is important also because some measures of yield are calculated using the clean price while some use the dirty price.

We begin our examination of bond yields by looking at the more straightforward measures, and moving later to more sophisticated ones. The examination is not exhaustive, however. We confine our attention to 'plain' or 'vanilla' bonds and even then we have omitted some of the least-used yield concepts. Readers who have occasion to calculate 'yields to call' or 'yields to put' or yields on index-linked bonds, are referred to the more comprehensive treatments in Blake (2000), Bodie and van Horne (2000) and Kane (2001).

**16.3.1 Running yield**

Imagine the simple case where one buys a bond, holding it for a period and then sells it for the price that one paid. In this case, the return on the bond consists of the periodic coupon payments and the *rate* of return relates this income stream to the price that was paid for it. This is shown in Equation 16.8, where  $C$  is the coupon

payment,  $P$  is the *clean* price and  $cy$  stands for what is known as the **running or interest or current yield**.

$$cy = \frac{C}{P} \quad (16.8)$$

It might seem strange to use the clean price in this calculation, since we usually think of the yield as the return that we receive in relation to actual outlay which in this case would be represented by the dirty or market price. The explanation for this practice can be derived from Figure 16.2. Figure 16.2 shows that the market price of a bond must vary systematically as a (linear) function of the number of days to the next coupon payment date. Since  $C$  is constant, it therefore follows (from Equation 16.8) that the systematic fluctuation in  $P$  would produce a systematic and opposite fluctuation in current yield. Indeed, we could, if we wished, draw a figure for the behaviour of running yield over time. It would be the reverse of Figure 16.2 with running yield declining systematically from one ex-dividend date, jumping back to its initial level on the next ex-dividend date.

Box 16.6, later in this chapter, contains a *Financial Times* listing of UK government bonds and shows the interest yield in the first column of figures.

**Box 16.2 Why bond prices change – in the short run**

The stock of bonds is given and prices fluctuate because of shifts in demand (in Figure 11.3 the supply curve is fixed). The demand curve for bonds shifts when bondholders revise their view of the value of holding bonds. If the revision applies to bonds in general, then the bond market as a whole rises or falls (and, remember, yields fall or rise). If the revision applies to one particular bond, or more likely a group of bonds with a particular maturity, then there is a change within the structure of bond prices and yields. Since, for most bonds, the income stream (the coupon payments) is given, changes in investors' valuation must come from changes in  $i$  – the rate of discount or the required rate of return. This means that bond prices change because there is a change in the level of risk-free interest rates or in the risk premiums which bondholders attach to those risk-free rates. Thus we would expect the bond market, *as a whole*, to fall when central banks announce a rise in official dealing rates and to rise when interest rates are reduced. The price of bonds issued by particular firms, or sometimes by particular governments, may fall, for example, if bondholders think they see an increase in the risk of default. If a risk-rating agency changes a bond's risk classification, there will certainly be a change in price.

If bond prices only changed with *actual* changes in interest rates or with actual changes in risk, explaining those price changes would be easy. But we often see the bond market rising or falling when nothing else appears to change at all. We must always remember that with tradable securities it is only possible for investors to make a capital gain (or avoid a capital loss) if they can *anticipate* what is going to happen to prices. This leads bond investors to be searching continually for indicators of what is *going to happen next* to interest rates or to risk premiums. And prices will change, because investors will buy and sell, if there is only a change in what people think is going to happen next, even if they are wrong! And once we start to think about what causes changes in people's expectations of interest rates, we create a virtually endless list of possible events. Consider, for example, how bond prices might respond to the following:

- (a) an unexpected announcement of an increase in official interest rates;
- (b) an unexpected increase in the rate of inflation;
- (c) an announcement of rapid credit growth in an economy enjoying a boom;
- (d) an announcement of increased retail sales in an economy in the depths of recession;
- (e) a government statement that it intended to halve the rate of inflation by the time of the next election;
- (f) the publication of better than expected export figures.

**Suggestions**

(a) prices fall; (b) assuming that the government's policy is to minimize inflation, prices fall in anticipation of a rise in interest rates; (c) as for (b); (d) since the economy is in recession, there is no simple connection with inflation or interest rates and prices may not be affected; (e) depends on whether investors believe their government, but prices probably fall; (f) probably leads to stronger currency and may allow government to reduce interest rates – prices probably rise.

Notice how frequently the mechanism connecting events to price changes involves inflation and interest rates, that investors often need to make a judgement about government policy and reaction, and that this often involves looking at the wider state of the economy.

**16.3.2 Simple yield to maturity**

Useful though the concept of running yield may be, it has the severe limitation that it takes no account of any capital gains or losses that investors will experience if they buy the bond when its market price differs from its par value, with the intention of holding it to redemption. Suppose, for example, that instead of long-term interest rates being 8 per cent, in our earlier illustration, they are 10 per cent. Then it follows that

our long-dated 8 per cent bond will not have a clean price of £100 on its coupon date, since there will be no buyers for an existing asset that pays 8 per cent when newly issued assets pay 10 per cent. In fact, to make it attractive, its price must stand at a discount to par. If it is a very long-dated bond, its clean price is likely to be about £80 (since the £8 coupon paid on an outlay of £80 is equivalent to 10 per cent). Someone buying this bond and holding it to redemption will enjoy a running yield of 10 per cent but will also

**Box 16.3 Why bond prices change – in the long run**

Over time, the stock of bonds increases (in Figure 11.3, the supply curve shifts to the right). This happens, firstly, because on balance firms expand and new firms are created, and, secondly, because governments frequently run budget deficits which are financed largely by the issue of new bonds. For a given demand schedule, the rightward drift of a supply curve would lead us to expect a decline in prices (and a rise in yields). But we know that this does not happen. Bond yields certainly rise over periods of time, but they also fall over other periods. There is no continuous upward trend, even though there is a continuous increase in the stock of bonds.

Our supply and demand framework tells us immediately that if the supply curve shifts continuously to the right without a continuous fall in prices (rise in yields), then it must be that something is pushing the demand curve to the right, and it is not difficult to see what that something is. We saw in Section 1.2 that the buyers of financial assets are agents who are running a financial surplus and that this surplus must result in a net acquisition of financial assets. Furthermore, this net acquisition of financial assets is a flow of spending which constitutes an addition to their stock of wealth. Over time, therefore, there is a more or less steady demand for extra financial assets to add to the stock of wealth. In our diagram, the demand curve for bonds moves to the right over time because new lending occurs every year. The extent to which the demand curve shifts per period of time depends upon the size of the financial surplus in that period and the major influence on that is the level of income out of which people can save. When the economy is expanding rapidly, the additional saving, the additional financial surplus and the additional demand for *new* bonds will be large.

We can now see that the long-run trend in bond prices (and yields) will depend upon the relative rates of shift of the supply and demand curves. This in turn depends upon the demand for new borrowing (acting on the supply curve) relative to the demand for new bonds to add to wealth (acting on the demand curve). There is no *inevitable* trend. If, for example, governments run large deficits for a number of years, the demand for the new bonds at the current rate of interest may not expand sufficiently quickly. If that is the case, then prices will tend to decline (and yields will rise). This is a development which is often predicted by politicians who wish to reduce the level of government spending and the size of the deficit. But it could easily happen that annual deficits are not large enough to match the rising demand. If that happens, persistent budget deficits will be accompanied by falling yields and rising prices.

benefit from a capital gain of £20 when the bond matures. We thus need some means of converting this capital gain into an equivalent annual return which can be added to the current yield. One way of achieving this is to calculate the **simple yield to maturity** or *smv*. The method is shown in Equation 16.9.

$$smv = \frac{C}{P} + \frac{100 - P}{n_m \times P} \quad (16.9)$$

$C$  and  $P$  are the coupon and the *clean* price, as above, while  $n_m$  is the number of years to maturity. We can see, therefore, that the simple yield to maturity begins by taking the running yield, calculated as in Equation 16.8,  $C/P$ . It then adds to this the capital gain (that is, the difference between the redemption value and the clean price), expressed as a percentage of the outlay spread over the number of years of the investment.

**16.3.3 Redemption yield**

The simple yield to maturity is certainly a more useful expression of yield for investors who intend to hold a

bond until redemption. But both the current yield and the simple yield to maturity suffer from the shortcoming that they ignore the fact that the coupon payments made over the life of a bond can be reinvested at the going rate of interest and thus understate the overall return that is available to bondholders. **Redemption yield** or *ry* takes account of the coupon payments and the fact that they can be reinvested, as well as any capital gain or loss that might occur between purchase and redemption. Unfortunately, its calculation ceases to be a straightforward matter. The redemption yield is the return that equates the discounted values of the bond's cash flows back to its *dirty* price. In other words, *ry* is the internal rate of return. Finding the redemption yield involves solving for *ry* in the rather forbidding expression, Equation 16.10.

$$P_d = \left( \frac{1}{(1 + \frac{1}{2}ry)^{n_c/182}} \right) \times \left( \sum_{t=0}^{Q-1} \frac{C/2}{(1 + \frac{1}{2}ry)^t} + \frac{M}{(1 + \frac{1}{2}ry)^{Q-1}} \right) \quad (16.10)$$

In Equation 16.10,  $n_c$  is the number of days between the current date and the next coupon payment;  $ry$  is the yield to maturity;  $Q$  is the number of coupon payments before redemption and  $P_d$  is the dirty price, that is, the clean price plus accrued interest. Equation 16.10 might usefully be compared with Equation 11.5, the earlier expression that we saw for the valuation of a bond with a fixed period to maturity. In Equation 16.10, the expression between large brackets to the right of the '×', corresponds to Equation 11.5, except that it has been modified to take account of the semi-annual payment of coupons. In Equation 11.5 we used  $i$  to discount the future cash payments on our (annual coupon) bond back to its current price; in Equation 16.10 we use  $ry$ . Thus  $i$  and  $ry$  in the two expressions are equivalent. However, we used a second simplification in Equation 11.5. We ignored the relationship between the date of valuation, 'today', and the coupon payment date. By implication, in Equation 11.5 we were assuming that we were valuing the bond on its coupon payment date. In Equation 16.10, the expression to the right of '×' uses  $ry$  to discount the future cash flows back to the next coupon payment date but, recognizing that the next coupon payment date may not be today but could be any fraction of a half-year away, we discount that value back to the present, wherever that may be in relation to the next coupon payment date, by using the expression to the left of '×'.

The value of  $ry$  cannot easily be found. It has to be done by iteration, using repeated values for  $ry$  until the value for the right-hand side of Equation 16.10 converges on the bond's dirty price. For a computer (or calculator with appropriate programmable functions) it is the work of a moment. Without such technology it can be done by using two approximations. From Equation 11.6 it might be recalled that (by setting  $n_m = \infty$ ) the valuation of a perpetual bond simplified to:

$$P = C/i \quad (16.11)$$

The same would follow in equation 16.10 if we set  $Q = \infty$ .<sup>1</sup> Naturally enough, if we set  $n_m$  (or  $Q$ ) very large, but less than infinity, then Equation 16.11

would be approximately true.<sup>2</sup> Recalling that  $i$  and  $ry$  are equivalent, then it becomes a fairly simple matter, for very long-dated bonds at least, to choose a value for  $ry$  in Equation 16.11 which generates a price reasonably close to the current dirty price. By then choosing a second value for  $ry$ , so as to generate a second price which 'brackets' the actual price, we can interpolate the precise redemption yield which makes the prospective cash flows equal to the dirty price. Box 16.4 provides an illustration.

For 'short'-dated bonds (less than 15 years), this approximation does not produce satisfactory results, but experience suggests that the following works reasonably well:

$$\text{Approximate } ry = \frac{C + \frac{M - P}{n_m}}{\frac{M + P}{2}}$$

where  $n_m$  is the number of years of residual maturity. After the initial estimate, the method follows that for long-dated bonds.

Box 16.6, later in this chapter, contains a *Financial Times* listing of UK government bonds and shows the redemption yield in the second column of figures.

### 16.3.4 Holding period yield

In many circumstances redemption yield will be a more relevant measure of yield than either current yield or the simple yield to maturity. However, it makes two assumptions which will make it inappropriate in certain circumstances. Firstly, and obviously, it assumes that investors hold the bond to redemption. Less obviously, while it takes into account the effect of compound interest on the coupons when they are reinvested (unlike the simple yield to maturity), it assumes that the coupons can be reinvested at the constant redemption yield. The first assumption is obviously inappropriate to investors who intend to sell before redemption. For them, it is not the par value that matters but the price of the bond at the time they wish to sell. The second assumption will often be

<sup>1</sup> In Equations 11.5 and 16.11,  $i$  is the internal rate of return and the redemption yield on a perpetual bond since  $i$  is the rate of interest that discounts the cashflows of a perpetual bond back to its present value. If Equation 16.11 is rearranged to find  $i$ , that is,  $i = C/P$ , it can be seen that the rearrangement is equivalent to the equation for current yield, Equation 16.8. Thus, for a perpetual bond, current yield and redemption yield are identical.

<sup>2</sup> In practice, the approximation is satisfactory for bonds with residual maturity in excess of 15 years.



**Box 16.4 Interpolating redemption yield**

Suppose that we wish to find the redemption yield for an 8% bond with just over 20 years to redemption. The bond is currently trading at £95 and there are 40 days to the next coupon payment.

Using Equation 16.11, we can make a first, rough, estimate:

$$ry = 8/95 = 8.42\%$$

Substituting 0.0842 in Equation 16.10 and solving for the price gives us £99.03. Since the bond is actually trading at £95, then our estimate of the redemption yield is clearly too low.

For a second trial, suppose that we take an estimate of 9.0%. Substituting this into Equation 16.10 gives a price of £93.98. This price lies below the actual market price, but the two prices taken together give us a basis for a more accurate estimate of redemption yield.

Firstly, we can see that the correct redemption yield lies nearer to 9.0% than it does to 8.42%. In fact, if we round our estimated prices to £99 and £94 for simplicity, we can see that the real price of £95 lies 4/5 of the way along the £99–£94 range. This might suggest that the redemption yield that we require lies 4/5 of the way along the interest rate spectrum of 8.42%–9.0%. 4/5 of this difference is 0.46. If we add this to 8.42% and solve Equation 16.10 once more using a redemption yield of 8.8%, we shall find that the estimated price does indeed match the actual price of £95.

This last step is an example of linear interpolation. If we let the subscripts 1, 2 and *a* stand for the first estimate, the second estimate and the actual values respectively, then we can summarize this last step formally:

$$ry_a = ry_1 + ((ry_2 - ry_1) \times P_1 - P_a / P_1 - P_2)$$

inappropriate for many bondholders, especially in a period of fluctuating interest rates. Ignoring accrued interest (that is, assuming that the bond is bought on a coupon payment date), the **holding period yield** (*hy*) is the rate that satisfies the expression:

$$P_d(1 + \frac{1}{2}ry)^{2m} = \frac{(C/2)(1 + \frac{1}{2}i_1)^{2n-1} + (C/2)(1 + \frac{1}{2}i_2)^{2n-2} + \dots + (C/2) + P_1}{(16.12)}$$

where *i*<sub>1</sub>, *i*<sub>2</sub> and so on are the rates of interest at which the first coupon, second coupon and so on can be reinvested, while *P*<sub>1</sub> is the price for which the bond is eventually sold. Solving for *hy* is done as follows:

$$hy = \left( \left[ \frac{(C/2)(1 + \frac{1}{2}i_1)^{2n-1} + \dots + (C/2) + P_1}{P_d} \right] - 1 \right) \times 2 \quad (16.13)$$

**Exercise 16.1 The interpolation of redemption yields on short-dated bonds**

Find an approximate yield to maturity for a 5% bond with just over three years to maturity, when there are 50 days left to the next coupon payment and there are six coupons remaining. The bond is currently trading at £92. From this approximation, find the exact yield to maturity.

**Hints**

- 1 From the expression above:  
(approximately)  $ry_1 = (5 + (100 - 92/3))/(100 + 92)/2 = 7.986 \approx 8.0\%$
- 2 Substitute 8.0%, and the characteristics of the bond, into Equation 16.10 and calculate a trial price, *P*<sub>1</sub>.
- 3 Use another trial value (*ry*<sub>2</sub>) which is bound to produce a second trial price (*P*<sub>2</sub>) for this bond such that the actual price (*P*<sub>a</sub>) lies between *P*<sub>1</sub> and *P*<sub>2</sub>.
- 4 Use the interpolation formula from the illustration in Box 16.4 to find the exact redemption yield.
- 5 Substitute the interpolated value for *ry* into Equation 16.10 and check that it does give the correct market price.

**Answer**

Taking *ry*<sub>1</sub> as 8.0% gives a *P*<sub>1</sub> of £94.76; taking *ry*<sub>2</sub> as 10.0% gives a *P*<sub>2</sub> of £90.39. Using the interpolation formula tells us that the redemption yield for an actual price of £92 is 9.263%.

## 16.4 Risk and fixed-interest bonds

In many respects, bonds appear to be very low-risk investments. Compared with shares, for example, the income stream is fixed. Bonds issued by most governments are default-free. Furthermore, in the case of corporate bonds, bondholders have a comparatively strong claim on any remaining assets in the event of the firm's bankruptcy.

This does not make them risk-free, however. In this section, we shall consider three types of risk to which bonds are subject:

- 1 Default risk;
- 2 Reinvestment risk;
- 3 Capital risk.

### 16.4.1 Default risk

Bonds, particularly government bonds, may be relatively secure instruments but this does not mean that their issuers *never* default. Corporations do go bankrupt and even governments can have problems. The Bank of Credit and Commerce International failed in 1991; Baring's bank failed in 1995; Eurotunnel unilaterally suspended interest payments on part of its debt in October 1995. In August 1982 the Mexican government announced that repayment of principal would be deferred and in 1991 there were doubts about the Italian government's ability to meet all its debt obligations exactly as specified. All such events mean that bond investors have to take default (or *credit*) risk seriously.

As always, investors face considerable costs in acquiring the information necessary for the assessment of the risk they face. This creates the opportunity for **credit rating agencies** to exploit economies of scale and specialist expertise in order to provide assessments of risk. This service is purchased by issuers of bonds who find that a reputable credit rating enables them to borrow on better terms than would be the case if investors had no guidance. The best known agencies are Moody's and Standard and Poor's (both based in the USA) and IBCA, a UK-based organization which merged with the French firm Euronotation in 1992.

Box 16.5 reports a Croatian Eurobond issue receiving a credit rating in January 1997. Notice firstly that the report confirms that getting a rating is expected

#### More from the web Assessing corporate risk

The need for lenders and investors to know as much as possible about the firm to which they might be lending, or in which they may be going to invest has given rise to a number of credit rating agencies. These are commercial organizations which have built up considerable experience over the years in recognizing those characteristics of any organization which increase or diminish its risk. As we explain in the text, this enables them to give a numerical or alphabetical score to firms which they assess.

One of the major credit rating agencies is Standard & Poor's, whose website can be accessed at: [www.standardandpoors.com](http://www.standardandpoors.com)

Their home page publishes the latest ratings awarded to selected bond issues. More interestingly, clicking on 'products a-z' and then on the letter 'c' gives access to 'credit risk assessment templates'. These give some idea of the factors taken into account in deciding on a rating.

to be beneficial. But notice also that the rating given to Croatian Eurobonds was 'BBB-'. The picture on the right shows the ratings used by the three agencies and this shows that 'BBB-' (or its equivalent) is a long way below the best. In fact, bonds rated from AAA to BBB (inclusive) are sometimes referred to as 'investment grade' bonds since it is only these bonds that professional investment managers are normally prepared to hold. Croatian bonds barely qualify, therefore. On the other hand, it is only when we get down to grade D that we are dealing with bonds which are either in default, or are likely to be in default. It follows from this that the difference in yield required by the market as we move from one grade to another looks comparatively small, usually less than 30 basis points. (But we must always remember, as we saw in Chapter 15, that these small differentials are being paid on very large sums and so quite fine differences have the ability to move large sums of money.) Bonds rated below BBB are known as 'speculative' or even '**junk**' bonds. (Note that 'junk', in this context, does not mean 'worthless'.)

The rating agencies are, naturally enough, mainly concerned with the ability of the bond issuer to meet his or her obligations. But in addition to this concern with 'ability to pay', the agencies also take into account



Box 16.5 Bond credit ratings

# Credit rating boost for Croat eurobond debut

By Kevin Done, East Europe Correspondent

Croatia's hopes of a successful debut in the international bond market grew yesterday after it received investment grade ratings from two leading international rating agencies.

The former Yugoslav republic, which is preparing to launch its first foreign currency eurobond next month, was awarded a BBB-rating, the lowest investment grade, by both Standard & Poor's of the US and IBCA, the European agency.

Moody's, the other leading US agency, is expected to release its first assessment early next week.

Croatia is rated at the same level as Hungary and Slovakia. It is also rated the same as Poland and Latvia by S&P and, outside east Europe, it is on a par with Greece and Tunisia.

Mr Bozo Prka, Croatian finance minister, said yesterday that the country would seek to raise \$250m in its debut foreign currency eurobond. It would have a maturity of five years, which was 'unimaginable until very recently,' he said.

The issue will be arranged by a syndicate of 15 international banks led by Merrill Lynch of the US and Union Bank of Switzerland. The price will be determined following a 20-day roadshow to institutional investors in Asia, the US and Europe beginning in the Far East this week-end.

Croatia, like other countries in eastern Europe, is hoping to take advantage of the increasingly keen

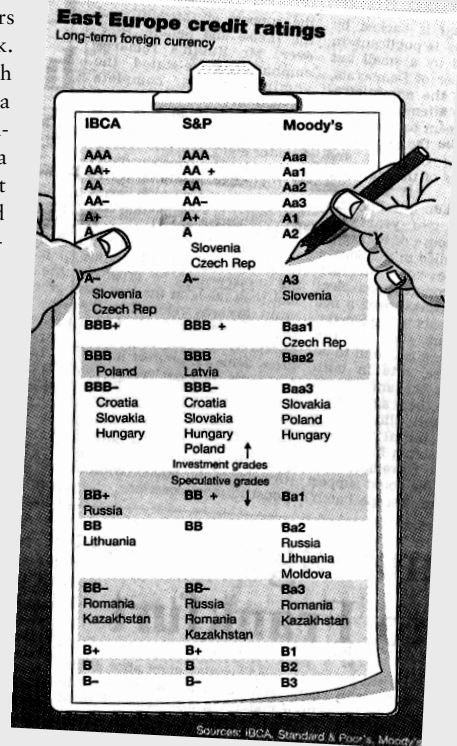
appetite among investors for emerging market risk. Earlier this week both Latvia and Moldova received their first international ratings, with Latvia assessed BBB investment grade by S&P and Moldova Ba2 (BB) speculative grade by Moody's.

Credit ratings reflect the perceived risk of default by a borrower on its debt. A strong rating, implying reduced risk to investors, usually means lower funding costs for the borrower.

IBCA said that the BBB-rating for Croatia reflected both the impressive way the economy had been stabilised, with the lowest rate of inflation of the transition economies and substantial export earning capacity and potential. External debt was still modest compared with both gross domestic product and foreign exchange receipts.

The agency said it believed the risks of Croatia becoming embroiled in another war were now small with frontiers mutually recognised by Croatia, Bosnia and Yugoslavia. The rapid Croatian military build-up meant there was now a balance of power in the region.

Tensions in Bosnia could 'taint Croatia by association', however,



Source: *Financial Times*, 18 January 1997.

\*Sources: IBCA, Standard & Poor's, Moody's.

the nature and terms of the obligation in the bond and, just in case things go wrong, the protection and claim that bondholders have. The case of Eurotunnel illustrates what is at issue here. Like many large corporations, Eurotunnel has issued more than one type of bond. The differences between these bonds often involve differences in the rights of the bondholders. The suspension of interest in 1995 applied only to the ‘subordinate’ debt. Holders of this subordinate debt had relatively little power and a low priority claim in the event of the firm’s liquidation. Consequently, this debt was rated more speculatively by S and P and carried a higher yield than ‘primary debt’.

### 16.4.2 Reinvestment and capital risk

Since, for conventional bonds, coupon payments are fixed for the life of the bond and since the par or maturity value is also fixed, it follows that purchasing a bond and holding it to redemption provides a known, fixed, rate of return. The redemption yield is fixed. However, we have already seen that the holding period return remains uncertain. This uncertainty arises (a) because we cannot be sure of the yield we can get on the coupon payments when we reinvest them and (b) our circumstances *may* change such that we have to sell the bonds before maturity, and we cannot then be certain of the price we shall get. Both of these uncertainties derive from a common source: a change in interest rates.

Naturally enough, bond yields must reflect these risks, by incorporating a premium which reflects both the degree of risk and the strength of the market’s aversion. We have already met the idea that some bond prices are more sensitive to interest rate changes in Section 11.3.2. It is now time to look carefully at why this is the case and also to explore ways of measuring the degree of interest rate sensitivity. For the latter, we shall examine the concept of **duration**. Two other, less common, measures are *convexity* and *dispersion*. Details of these can be found in Blake (2000, Ch. 5).

Imagine a bond which makes annual coupon payments. Then:

$$\text{Duration} = \frac{1C}{(1 + ry)^1} + \frac{2C}{(1 + ry)^2} + \dots + \frac{n_m(C + M)}{(1 + ry)^{n_m}} \quad (16.14)$$

$P_d$

If we now recall (from the appendix to Chapter 11) that we can dispense with the summation by using the alternative expression for the present value of an annuity:

$$P = \frac{C \left( 1 - \frac{1}{(1 + ry)^{n_m}} \right)}{ry} = C/ry(1 - [1 + ry]^{-n_m}) \quad (16.15)$$

then:

$$\text{Duration} = \frac{\left[ \frac{C(1 + ry)}{ry} \right] \left[ \frac{1 - (1 + ry)^{-n_m}}{ry} \right] + \left[ \frac{n_m(m - C/ry)}{(1 + ry)^{n_m}} \right]}{P_d} \quad (16.16)$$

For purposes of illustration, imagine a bond with a £5 coupon paid annually, redeemable in three years’ time, and a par value of £100. If the redemption yield is 8 per cent, then (from Equations 11.5 or Appendix 11.1) its current price must be £92.268.

Substituting these values into Equation 16.16 gives:

$$[(67.5) \times (2.577) + (89.306)]/92.268 = 2.853$$

Notice what happens to duration if the coupon had been £6, redemption yield and period to maturity remaining constant. Firstly, we would of course expect the price of the bond to be higher. Using Equation 11.5 again,  $P = £94.36$ . Solving Equation 16.16 again using the new coupon and new price but leaving the redemption yield and maturity as before gives:

$$[(81.0) \times (2.577) + (59.537)]/£94.846 = 2.829$$

We find that the higher coupon gives us a lower value for duration.

Consider now what happens if we change the redemption yield. Suppose that we leave everything as it is ( $C = 6; n_m = 3$ ), but increase the redemption yield to 12 per cent. Firstly, the market price falls to £85.589. More interestingly, duration is reduced to 2.819.

From these illustrations, we can draw three conclusions about duration, maturity, coupon and redemption yield, at least as they apply to *coupon-bearing, redeemable* bonds:

*Duration and maturity.* For a given coupon, duration increases with maturity. Thus, other things being equal, long-dated bonds are more sensitive to interest

rate changes, and therefore riskier, than short-dated bonds.

*Duration and coupon.* For a given maturity, duration diminishes as the coupon increases.

*Duration and redemption yield.* For a given maturity, duration diminishes as redemption yield increases.

From this it follows that the riskiest bonds, that is, those whose prices are most sensitive with respect to interest rate changes, are those with long maturities and low coupons. Furthermore, the riskiness of all bonds is greater when interest rates are low.

These propositions apply to coupon-bearing bonds with a fixed period to maturity. Note that zero coupon (pure discount) bonds and perpetual bonds are special cases which behave rather differently. Firstly, for a zero coupon bond we set  $C = 0$  in Equation 16.16. The duration is thus equal to maturity ( $n_m$ ) and zero coupon bonds have the greatest duration and price volatility for bonds with that maturity. Secondly, for an irredeemable bond, in Equation 16.16 we set  $n_m = \infty$ . For perpetual bonds then  $\text{duration} = (1/ry) + 1$ .

Duration is defined as the weighted average maturity of a bond. The logic behind the idea of 'weighted average maturity' is that for bonds which pay regular coupons, the total cashflow from that bond is spread over a period (from now to the date of maturity). Depending upon the characteristics of the bond, this cashflow could be heavily weighted towards the immediate future or towards the more distant future. Since changes in the discount rate always have a larger effect upon distant payments than upon short ones, a bond where the weight of payments is soon should be less interest-sensitive than a bond where the weight of payments lies further away. Duration, therefore, is trying to capture the average time that it takes to receive the cashflow. The weights are the relative discounted cashflow in each period and the weighted average is simply the sum of those weights.

This is easier to see if we go back to Equation 16.14 and consider an example which compares duration for two bonds, each paying a 5 per cent annual coupon, trading at par, with  $ry = 5$  per cent, but bond A maturing in two years and bond B maturing in three years' time. For bond A:

$$D = (4.776 + 190.476)/100 = 1.953$$

While for bond B:

$$D = (4.776 + 9.070 + 272.114)/100 = 2.859$$

Notice that for both bonds duration is less than the period to maturity. This must be the case since some cashflow in both cases comes from interim coupon payments. In the case of bond A, one may say that the interim coupon payments contribute 0.0478 of the duration value of 1.953, while the final coupon *plus* maturity payment contributes 1.9057. As proportions, these represent 2.44 per cent and 97.56 per cent respectively. For bond B, duration is 2.859, to which interim coupon payments contribute 0.138, while the redemption payment contributes 2.721. As proportions, these represent 4.83 per cent and 95.17 per cent respectively. With the longer dated bond a larger weight attaches to the interim coupon payments.

We can now show formally that duration is a measure of interest rate risk. Assuming still that coupon payments are annual, then the present value of a bond is given (see Equation 11.5) by:

$$P_d = \sum_{t=1}^n \frac{C}{(1+ry)^t} + \frac{M}{(1+ry)^{n_m}} \quad (16.17)$$

Differentiating with respect to  $(1+ry)$

$$\begin{aligned} \frac{\Delta P_d}{\Delta(1+ry)} &= -C \sum_{t=1}^n \frac{t}{(1+ry)^{t+1}} \\ &\quad - M \frac{n_m}{(1+ry)^{n_m+1}} \end{aligned} \quad (16.18)$$

If we now multiply both sides by  $(1+ry)/P_d$  we have:

$$\begin{aligned} \frac{\Delta P_d / P_d}{\Delta(1+ry)/(1+ry)} &= \frac{C}{P_d} \sum_{t=1}^n \frac{t}{(1+ry)^t} \\ &\quad - \frac{M}{P_d} \frac{n_m}{(1+ry)^t} = -D \end{aligned} \quad (16.19)$$

The leftmost expression in Equation 16.19 is the elasticity of the bond price with respect to  $(1+ry)$ . The larger the value of duration, the larger the (negative) elasticity.

## 16.5 The term structure of interest rates

The **term structure of interest rates** refers to the pattern of interest rates available on assets differentiated *solely* by their term to maturity, and a plot of these rates against the period to maturity is known as a **time–yield curve**. An example is provided in Figure 16.3.

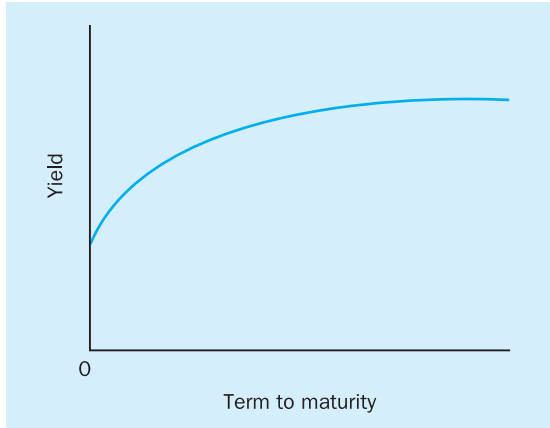


Figure 16.3 A time–yield curve

The central issue of term structure discussions is the effect that the period to maturity has upon yields, when all other possible explanations for yield variation have been removed. In order to study the term structure, therefore, we need a large population of assets which are homogeneous, particularly with respect to default risk, but exist in a wide range of maturities. Not many asset groups can meet these requirements. The most obvious candidates in most countries are government bonds. They are all issued by the same (and therefore constant risk) issuer, and they exist in a wide variety of maturities. Some term structure investigations use treasury bills for the same reason, though the range of maturities is limited to <1 year, of course. Occasionally interbank deposits are used, though the maturities are even more restricted. Because the ‘term structure’ so often means the term structure of yields on government bonds, and also because one theory (the ‘term premium’ theory) of the term structure draws upon technicalities which we have just been discussing, this is the obvious place in which to examine it more closely.

Before we begin, however, we need to be clear that one can plot a yield curve for every meaning of the term ‘yield’ which we identified in the last section. Fortunately, in practice, discussions of the yield curve are almost always discussions of the curve which plots

redemption yields against period to maturity. Unless we state otherwise, ‘yield’ means ‘redemption yield’ throughout this section.

We examine three theories which try to explain the relationship between term to maturity and yield: the **expectations**, the **term premium** and the **preferred habitat/market segmentation** theories. They are presented in this order which roughly corresponds to their importance in the specialist literature. It is useful to note at the outset that the theories are not mutually exclusive. The yield curve *could* be determined by expected future interest rates, with a term premium reflecting the general level of risk aversion and ‘local’ premiums or discounts reflecting the abundance or shortage of bonds in a particular part of the maturity spectrum.

### 16.5.1 Expectations theory

The idea that the term structure could be explained by reference to market expectations of future interest rates dates at least from Irving Fisher (1930) and was discussed extensively by Hicks (1939).<sup>3</sup>

The term structure of interest rates presents investors with a variety of interest rates on assets differentiated solely by their term to maturity. At the very least an investor looking to invest for  $L$ -years has a choice between holding a ‘long’ bond to maturity in  $L$ -years at a ‘long-term’ rate of interest,  $i_L$ ,<sup>4</sup> which is currently known, and holding a succession of short-dated bonds, only the first of whose rates of interest,  $i_1$ , is currently known, reinvesting the proceeds at the end of each period in another short-dated bond whose rate of interest,  $\hat{i}_2$ , is not known now, but can only be anticipated.

Let us assume that an investor wishes to invest for two years ( $L = 2$ ) and that the investor is risk neutral. Furthermore, let us suppose that s/he knows the current one-year rate of interest ( $i_1$ ), the current two-year rate of interest ( $i_2$ ) and holds a confident expectation about the one-year rate ( $\hat{i}_2$ ) that will prevail in one year’s time. Then it follows that s/he will be indifferent between these two investment strategies when:

$$(1 + i_1)(1 + \hat{i}_2) = (1 + i_2)^2 \quad (16.20)$$

<sup>3</sup> More recent extensions and modifications of the theory appear in Malkiel (1966) and Roll (1970).

<sup>4</sup> Remember that yields throughout the following discussion of term structure are assumed to be nominal redemption yields (yields to maturity). The long-term rate should therefore strictly be written  $r_L$ . However, when we talk about nominal long-term redemption yields, we are talking, most of the time, about what is for many purposes the long-term nominal interest rate,  $i_L$ . Through the remainder of this section we have used the symbol  $i_L$  for reasons of brevity, and clarity in the mathematical expressions.



### Box 16.6 Bond yields and maturity

The table reproduced below is taken from the London *Financial Times* for Saturday, 1 May 2004 and shows the behaviour of UK government bond prices and yields on 30 April. The *FT* currently publishes this full list only on a Saturday; on other days it publishes a summary. The table appears on the 'Currencies, Bonds and Interest Rates' page. The table illustrates a number of points which we have already discussed in this chapter. Notice:

- The title of each bond includes the coupon rate and the year of redemption.
- The bonds are listed in increasing order of their residual maturity.
- The first column of figures shows the current price.
- The second column shows the price change (in p) from the previous day.
- The next column shows the change in price over the week as a percentage of the price at the beginning of the period.
- The fourth column shows the redemption yield.
- The fifth and sixth columns show the highest and lowest price of the bond in the preceding 52 weeks.

#### UK GILTS – cash market

Apr 30	Notes	Price £	Chng	Wk % Chng	Yld Red	... 52 week ...		Notes	Price £	Chng	Wk % Chng	Yld Red	... 52 week ...		
						High	Low						High	Low	
<b>Shorts" (Lives up to Five Years)</b>															
Tr 10pc '04	⌘	100.22	-06	-1	4.12	106.58	<b>100.22</b>								
<b>Tr 5pc '04</b>		100.08	-01	...	4.09	101.84	<b>100.08</b>								
Cn 9 <sup>1</sup> / <sub>2</sub> pc '04	⌘	102.35xd	-05	-2	4.45	108.67	<b>102.35</b>								
Tr 6 <sup>3</sup> / <sub>4</sub> pc '04		101.35	-02	-1	4.28	105.14	<b>101.35</b>								
Cn 9 <sup>1</sup> / <sub>2</sub> pc '05		104.66xd	-04	-2	4.46	111.36	<b>104.66</b>								
Ex 10 <sup>1</sup> / <sub>2</sub> pc '05	⌘	107.86xd	-04	-2	4.54	115.78	<b>107.86</b>								
<b>Tr 8<sup>1</sup>/<sub>2</sub>pc '05</b>		105.99	-03	-2	4.55	112.37	<b>105.99</b>								
Tr 7 <sup>3</sup> / <sub>4</sub> pc '06		106.76xd	...	-2	4.67	113.28	106.76								
Cn 9 <sup>3</sup> / <sub>4</sub> pc '06	⌘	111.89	...	-2	4.71	120.24	111.89								
<b>Tr 7<sup>1</sup>/<sub>2</sub>pc '06</b>		106.76	+02	-2	4.70	113.37	106.76								
Tr 4 <sup>1</sup> / <sub>2</sub> pc '07		99.37	+04	-2	4.74	100.13	99.33								
Tr 8 <sup>1</sup> / <sub>2</sub> pc '07		110.97	+02	-2	4.76	119.01	110.95								
<b>Tr 7<sup>1</sup>/<sub>4</sub>pc '07</b>		108.02	+04	-2	4.79	115.43	107.98								
<b>Tr 5pc '08</b>		100.66xd	+06	-2	4.81	106.38	99.99								
Tr 5 <sup>1</sup> / <sub>2</sub> pc '08-12		102.13xd	+05	-2	4.95	109.02	101.71								
Tr 9pc '08	⌘	116.20xd	+04	-2	4.90	125.75	116.16								
<b>Tr 4pc '09</b>		96.30xd	+07	-2	4.87	101.96	95.12								
<b>Five to Ten Years</b>															
Tr 8pc '09	⌘	114.55xd	+07	-2	4.90	124.08	114.48								
<b>Tr 5<sup>3</sup>/<sub>4</sub>pc '09</b>		104.18	+08	-2	4.89	111.94	103.57								
<b>Tr 6<sup>1</sup>/<sub>4</sub>pc '10</b>		107.39	+09	-2	4.92	116.12	106.79								
<b>Cn 9pc Ln '11</b>		124.27	+10	-2	4.95	135.92	124.17								
Tr 7 <sup>3</sup> / <sub>4</sub> pc '12-15		116.35	+12	-2	5.16	126.67	116.04								
<b>Five to Ten Years</b>															
Tr 8pc '12		100.23xd	+13	-2	4.96	108.42	99.18								
Tr 9pc '12	⌘	126.61	+12	-2	5.02	138.62	126.49								
Tr 8pc '13		122.51xd	+14	-2	4.97	134.66	122.28								
<b>Ten to Fifteen Years</b>															
Tr 5pc '14		100.16xd	+15	-2	4.98	109.00	98.97								
Tr 8pc '15		126.56	+20	-2	4.96	138.76	125.75								
Tr 8 <sup>3</sup> / <sub>4</sub> pc '17		136.43xd	+23	-2	4.97	149.74	135.54								
Ex 12pc '13-17	⌘	152.96	+14	-2	4.99	169.09	152.82								
<b>Over Fifteen Years</b>															
Tr 8pc '21		135.00	+29	...	4.94	147.98	133.89								
Tr 5pc '25		101.33xd	+29	0.1	4.90	110.90	99.89								
Tr 3pc '28		116.31	+38	0.1	4.86	127.33	114.68								
Tr 4 <sup>1</sup> / <sub>4</sub> pc '32		91.25	+33	0.2	4.82	100.09	89.68								
Tr 4 <sup>1</sup> / <sub>4</sub> pc '36		91.26xd	+37	0.3	4.79	100.19	89.69								
<b>Undated</b>															
Cons 4pc	⌘	77.04	+25	0.2	-	88.54	74.61								
War Ln 3 <sup>1</sup> / <sub>2</sub> pc		72.29	+26	0.2	-	82.74	70.08								
Cn 3 <sup>1</sup> / <sub>2</sub> pc '61 Aft	⌘	73.51xd	+27	0.2	-	85.80	70.93								
Tr 3pc '66 Aft		59.49xd	+19	0.1	-	63.85	54.15								
Cons 2 <sup>1</sup> / <sub>2</sub> pc	⌘	50.88xd	+16	0.1	-	56.08	47.18								
Tr 2 <sup>1</sup> / <sub>2</sub> pc		50.86xd	+40	0.5	-	57.58	49.21								

• Source: Debt Management Office (DMO). ALL UK Gilts are tax-free to non-residents on application. xd Ex dividend. Closing mid-prices are shown in pounds per £100 nominal of stock. Int yield: Interest yield. Red yield: Gross redemption yield. Prospective real Index-Linked redemption yields are calculated by HSBC Bank plc from Gemma closing prices. ⌘ Indicative price. Gilts benchmarks and most liquid stocks, are shown in bold type. The full list of Gilts can be found daily on [ft.com/bonds&rates](http://ft.com/bonds&rates).

Source: *Financial Times*, 1 May 2004.

We said at the beginning of this section that the 'term structure' is often studied by looking at yields on government bonds, and that the yields in question are usually redemption yields. Examine carefully the fourth column of figures in the table. At the very shortest end of the maturity spectrum, the redemption yield is c. 4.1 per cent. Moving up the maturity spectrum, yields are 4.9 per cent for bonds with five years to maturity. They continue to rise through the medium range reaching 5.16 per cent for bonds maturing in 2012. Thereafter, yields decline very slightly. Clearly, on 30 April 2004, the yield curve for UK government bonds was upward sloping at the short end.

Furthermore, knowing  $i_1$  and  $i_L$ , we can solve for the expected, or *implied*, future spot rate,  $\hat{i}_2$ , as follows:

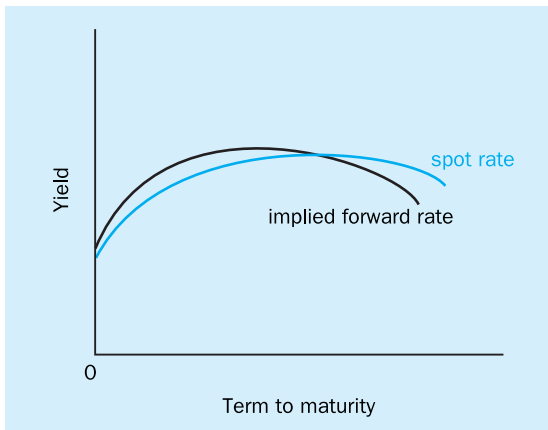
$$\hat{i}_2 = \frac{(1 + i_L)^2}{(1 + i_1)} - 1 \quad (16.21)$$

In recent years, some authorities have taken to referring to the implied future spot rate as a *forward* rate.

Turning now to the relationship  $i_L - i_1$ , the relationship between long and short rates, it follows from Equation 16.21 that if  $i_L > i_1$ , then  $\hat{i}_2$  is also greater than  $i_1$ , that is to say that the investor expects future one-year rates to be above current one-year rates. Rearranging Equation 16.21 tells us indeed that with  $i_L > i_1$ , then  $\hat{i}_2$  must also be greater even than  $i_L$ .

$$i_1 = \frac{(1 + i_L)^2}{(1 + \hat{i}_2)} - 1 \quad (16.22)$$

The common sense of this of course is that an investor willing to buy a one-year bond now at a rate of interest below the going two-year rate must expect at the end of the first year to be able to replace the first one-year bond with a second which pays a (one-year) rate of interest which is higher than the current two-year rate by the amount necessary to produce an average return over the two years just equal to  $(1 + i_L)$ . As Shiller (1990) helpfully points out this is analogous with the marginal cost/average cost relationship. When the yield curve is rising, forward rates must be higher than spot rates of the same maturity and vice versa when the yield curve slopes downward. This is shown in Figure 16.4.



**Figure 16.4** The spot rate–implied forward rate relationship

Turning from the individual investor to the market for one- and two-year bonds as a whole, equilibrium, indicated by stable bond prices, will exist when all investors are indifferent between holding two one-year bonds and one two-year bond, that is to say when the market as a whole takes  $i_L$  to be an average of the known one-year rate,  $i_1$ , and the *expected* future one-year rate  $\hat{i}_2$ . Were this not to be the case, suppose for example that  $i_L$  were greater than the average of the two short rates, then arbitrage between long and short bonds would push up the price of long bonds until  $i_L$  was reduced to the average of the short rates. Notice that the argument depends upon complete substitutability between long and short bonds. We return to this in the next section.

The principles which underlie the choice between one- and two-year bonds can of course be generalized to cover bonds of all maturities. In our example, we took  $i_L$  to be the rate on two-year bonds. Thus reordering Equation 16.20 we have:

$$(1 + i_L)^2 = (1 + i_1)(1 + \hat{i}_2) \quad (16.23)$$

and thus:

$$i_L = \sqrt{(1 + i_1)(1 + \hat{i}_2)} - 1 \quad (16.24)$$

Equation 16.24 is very closely approximated by the linear expression:

$$i_L = \frac{i_1 + \hat{i}_2}{L} \text{ or } \left(\frac{1}{L}\right)(i_1 + \hat{i}_2) \quad (16.25)$$

where  $L$  defines the period to maturity of the bond on which  $i_L$  is paid. Thus with  $i_L$  paid on a two-year bond, the value of  $i_L$  (from Equation 16.25), is:

$$\left(\frac{1}{2}\right)(i_1 + \hat{i}_2) \quad (16.26)$$

that is to say, a simple average of the two one-year rates. More generally, however, we may say that:

$$i_L = \frac{i_1 \cdot K + \hat{i}_2 \cdot (L - K)}{L} \quad (16.27)$$

where  $K$  is the period of time on which  $i_1$  is paid and  $(L - K)$  is the remaining period to maturity on which  $\hat{i}_2$  is expected to be paid. According to the expectations theory, therefore, any ‘long-term’ rate of interest,  $i_L$ , is said to be a *weighted* average of expected future short-term rates, where  $K$  and  $L - K$  (in Equation 16.27) are the weights.



Plotting the (actual) yields on offer at any particular time (in effect plotting the value of  $i_L$  from  $L = 1$  to  $L = \infty$ , since undated bonds or ‘consols’ are available) produces what is called the ‘time–yield curve’. Figure 16.5 shows just three possible shapes for this curve, corresponding (1) to the situation where future short rates are expected to rise ( $i_L > i_1$  in our example); (2) to the situation where future short rates are expected to remain unchanged ( $i_L = i_1$ ); (3) to the situation where future short rates are expected to fall ( $i_L < i_1$ ).

The diagram needs careful interpretation, particularly with regard to the horizontal axis. It is important to remember that the time–yield curve shows the rate of interest available *now* on assets of varying periods to maturity. *It must not be read as telling us those interest rates that will prevail at a particular time from now.* If the expectations hypothesis holds, then the yield curve implies forward rates but it does not show them. What it shows are today’s rates.<sup>5</sup>

Since, according to the expectations theory, the shape of the curve depends entirely upon the market’s expectation of the future level of interest rates, the curve obviously could take any shape. It could approximate

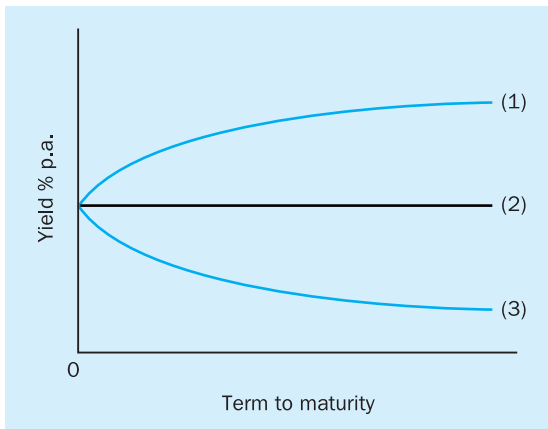


Figure 16.5 Three time–yield curves

any of the three cases in Figure 16.5, but it could also be humped, if investors thought interest rates would first rise and then fall; or it could have a trough, indicating the expectation of a fall followed by a rise. Several humps, troughs or even mixtures of both are possible. The ability of the expectations theory to explain any particular shape is limited only by our ability to supply sufficiently ingenious rationalizations for investors’ interest rate expectations. It follows equally that no conceivable shape to the curve could lead us to a firm conclusion about the validity of the expectations theory. However, it is worth noting that the theory draws some informal support from the observed tendency for the time–yield curve to slope downwards when interest rates are historically high, and to slope upwards when rates are near the bottom of their range. This would be consistent with the idea that investors perceive a band of ‘normal’ interest rates to which they expect future rates to return whenever current rates are at or outside the limits of the band.

One of the most interesting developments in the recent study of the term structure is the possibility of extracting information about future interest and inflation rates from the shape of the yield curve. The argument is that *if* the expectations theory is accepted, and we then add the assumption that those expectations are generally correct, then the shape of the curve should be an accurate predictor of future nominal interest rates. (Indeed, this would be true even if the term structure also contained a term premium, provided such a premium were stable.) Taken in general, the findings from empirical tests have not supported the hypothesis. Mankiw and Miron (1986, p. 216) offer one fairly representative judgement. ‘Contrary to the expectations theory, the slope of the yield curve appears to exhibit no predictive power at any time since 1915.’<sup>6</sup> However, in spite of the failure to find widespread evidence in its support, the expectations hypothesis has continued to attract attention. This is undoubtedly due to its attraction, when combined with the ‘Fisher hypothesis’, as a predictor of inflation in a

<sup>5</sup> Theoretically, the rates reported in a time–yield curve are those which prevail *simultaneously*. In empirical work, therefore, the rates should be those that existed at a single moment. It is not, strictly speaking, appropriate to construct a time–yield curve from data recorded even at different times of the same day. Theoretical purity is not always possible in empirical work, of course, and this requirement explains the tendency for researchers to use rates recorded at the end of a day’s trading.

<sup>6</sup> Their explanation is interesting. The failure of the market to anticipate future interest rates accurately coincides with the setting up of the Federal Reserve Board and its subsequent interventions in the money market to set interest rates according to its policy preferences. (This activity was examined in the last chapter.) If this is true, it amounts to saying that, left to itself (for example, before 1915) the market is quite efficient in the judgement it makes about future interest rates, but it simply cannot outguess the next move of central banks committed to using interest rates at their own discretion.

period when inflation has emerged as a major policy issue and when conventional indicators of the policy stance have failed. We saw in the last chapter that monetary policy in several countries in the 1980s was initially based upon the pursuit of monetary growth ‘rules’ or ‘targets’, on the argument that a stable velocity of circulation together with a ‘natural rate’ of productivity growth would produce a close connection between monetary growth and inflation. Given these rules or targets, policy could then be easily judged for ‘slackness’ or ‘tightness’ depending on whether the targets were achieved or under- or overshot. We are not concerned here with the pretty dismal record of failing to hit the targets. More relevant is the fact that in both the USA and the UK a dramatic collapse in velocity destroyed the money–inflation link. The targets, even had they been achieved, no longer indicated anything of significance.

Combining the expectations theory of the term structure with the Fisher hypothesis seemed to offer an ingenious alternative way of interpreting the state of policy. The Fisher hypothesis is that nominal interest rates are composed of a (fairly stable) real rate plus an inflation premium. Thus *if* (after Fisher) expected nominal interest rates *are* composed of a stable *ex ante* real rate plus an inflation premium, and *if* the shape of the yield curve *is* determined wholly by rational expectations of future short rates, then in telling us about future nominal interest rates the yield curve would be telling us about the market’s expectation of future inflation and therefore about (the market’s interpretation of) the current tightness or laxity of monetary policy. Unfortunately, tests of its predictive

ability, both of future short-term interest rates and of the rate of inflation, have not generally suggested that it is particularly effective.

It is not altogether essential, however, for the term structure to be an accurate predictor of future inflation or interest rates for it to have some role in the formulation and evaluation of policy. Provided, for example, that one thought the shape of the curve was generally correct in pointing to the *direction* of change in future rates, then it could still function as a guide, especially if there were little else. This seems to have been the case in the USA and in Germany (and to a lesser extent in the UK) during the period of falling interest rates in 1992–93. The authorities made a succession of small cuts in official discount rates while watching the yield curve for any sign of steepening. Provided all rates came down broadly in step, the policy was ‘justified’. But when a cut in short rates caused the curve to steepen this was taken as evidence that the probability of a higher inflation in future had increased and the cuts stopped.

## 16.5.2 The term premium theory

If the expectations theory is attractive because it is consistent with one frequently observed feature of the curve’s behaviour, the term premium theory is attractive for the same reason. But the feature this time is the curve’s historical tendency to slope upward except when interest rates are at very high levels, indicating that, as a general rule, higher yields are available on bonds with longer maturities. Clearly, this is a problem for the expectations theory. If the curve does, as a rule, slope upward when current interest rates are in their ‘normal’ range, the expectations account would lead us to believe that investors expect future interest rates, as a rule, to be higher than today’s. It does not seem very likely that investors expect interest rates to rise persistently over time.

The question for the term premium theory therefore is what characteristic might longer-dated bonds possess which makes them *systematically* unattractive, so that investors must be paid some premium to induce them to hold longer bonds? One obvious, but wrong, suggestion might be that investors require a ‘liquidity premium’ to induce them to ‘lock up’ their funds for a long period. Hicks, following Keynes in the *General Theory*, advanced the idea that investors required a premium to induce them to hold longer-dated

### More from the web The UK Debt Management Office

On 1 April 1998, responsibility for managing the UK’s national debt was passed to a newly created agency, the Debt Management Office.

Its website explains its remit as regards managing the government’s borrowing. It also provides a brief history of national financial management in the UK with articles on the history of the Bank of England and of the UK Treasury. It also provides historic and recent data on the UK’s national debt.

The address is: [www.dmo.gov.uk](http://www.dmo.gov.uk)

bonds. Hicks, however, was careful to refer to a ‘risk premium’. The problem lies in what one understands by ‘liquidity’. Strictly, as we have had occasion to point out elsewhere in this book, liquidity refers to the ease with which an asset can be converted into money, *with capital certainty*. Most assets can be converted into money quickly, and even cheaply, if the rate of exchange sufficiently favours the buyer. A long-dated bond is no less liquid than a short-dated one, in the limited sense of investors being able to sell the bond for cash. There is, in most developed countries and certainly in the UK, a highly developed secondary market for government securities (as we shall see in the next section). The possibility that holders of long-dated bonds require a ‘liquidity premium’ has nothing to do with any difficulty in disposing of long bonds. We must not confuse a bond’s term to maturity with the period for which investors must hold it. Terms like ‘risk premium’ or ‘term premium’ are less likely to cause this confusion than ‘liquidity premium’.

What else might it be about a long-dated bond that requires the payment of a term premium? The answer lies in Equations 16.17 and 16.19. The first shows that the market price fluctuates with interest rates while the second shows that the interest-elasticity increases with duration. A future change in interest rates thus causes a capital gain or loss for bondholders who may wish to sell before maturity. Uncertainty about future interest rates has introduced risk. In itself, however, the recognition of risk does not add anything to our understanding of the term structure that is not already supplied by the expectations theory. The expectations theory recognizes that people do not know what future interest rates will be. The yield curve takes the shape dictated by the weight of expectation in the market as to what future rates will most probably be. Only if the expectations theory included an additional supposition (which it does not) that investors generally made upwardly biased estimates of future interest rates would we have any reason to expect a generally upward-sloping curve. If we take the more reasonable view that there is no reason why market participants should consistently under- or overestimate the future level of rates, there must be an actuarially even chance

of under- or overestimation and thus, on average, expectations should turn out to be correct. Thus, the specific recognition of risk notwithstanding, there is still no reason to expect a general tendency for the curve to slope upward.

Suppose, however, that investors had an asymmetrical attitude to the actuarial symmetry of winning and losing.<sup>7</sup> Suppose that they attach more *significance* to the possibility of loss than to the possibility of gain. One obvious and frequently suggested justification for this possibility is that wealth is subject to diminishing marginal utility – a given increase yields less satisfaction than the loss of satisfaction which follows from a decrease of equal magnitude. In these circumstances, investors are said to be *capital risk averse* and the market is dominated by **capital risk aversion**. While risk itself may not take us far in explaining the upward-sloping tendency, capital risk aversion most certainly does. Imagine investors faced with the choice between a default-free, demand deposit and a (default-free and so on) security giving the same return but having (obviously) a longer term to maturity than the demand deposit. Suppose also that investors hold confident expectations that interest rates will remain as they are and that they rate the possibility that interest rates may (unexpectedly) rise *equally with the possibility that rates may fall*. Actuarially, investors expect the same return from both investments but clearly, if risk aversion is present, they will choose the deposit unless some interest premium or other form of inducement is offered to persuade them to hold the (risky) security.

In the presence of capital risk aversion we can see why a premium might be demanded for a term security when compared with a zero-term deposit. Furthermore, knowing that the interest-elasticity of bond prices varies with duration, we can now see why longer-term securities are seen as more risky than mediums, and mediums as more risky than shorts and thus why the term premium should increase with the term to maturity.

According to the term premium theory, any long-term rate of interest,  $i_t$ , thus contains a risk premium,  $\theta_t$ , which is dependent upon the degree of capital risk

<sup>7</sup> In fact, an equal chance of interest rates rising or falling by the same amount does not produce a strict actuarial symmetry. The result is biased in favour of *capital gain*. This arises because in the pricing formula we divide by the gross interest rate  $(1 + i)$ . Suppose that the bond in Equation 11.5 has an annual coupon of £6 ( $C = 6$ ) and pays £100 ( $M = 100$ ) in four years ( $n_m = 4$ ). If interest rates are 10 per cent ( $i = 0.1$ ) then the market value is currently £87.08. If interest rates fall to 9 per cent, the formula prices the bond at £90.11, a capital *gain* of £3.03. A one point *rise* in interest rates, by contrast, causes the price to fall to £84.19, a capital *loss* of only £2.89.

aversion in the bond market and the residual maturity of the bond on which it is paid. In Equation 16.28, for example, the risk premium,  $\theta_L$ , on a bond with ( $L$ ) periods to maturity is proportional to ( $L$ ) with the proportion,  $p$ , indicating the market's degree of capital risk aversion.

$$\theta_L = p(L) \tag{16.28}$$

As with the expectations theory, mere observation of yield curves does not allow us to endorse or reject the risk premium theory. Any of the curves in Figure 16.5, and indeed any other curve we may care to imagine, *may* contain evidence of a term-related risk premium. Indeed, as we said at the opening of this section, the term premium theory is not inconsistent with a role for expectations. In Figure 16.5 curve (1) is clearly consistent with a positive term premium. *If* we knew that investors expected the current rate,  $i_1$ , to continue unchanged ( $i_1 = \hat{i}_2$ ) then curve (1) would be determined *solely* by the term premium and its slope would be given by  $p$  in Equation 16.28. In Equation 16.29,  $i_1 = \hat{i}_2$ , but  $i^* = \theta^* + \hat{i}_2$

$$i^* = (1 + i_1) (1 + \hat{i}_2) + \theta_L - 1 \tag{16.29}$$

However, it is also possible that the market expects future rates to rise ( $i_1 < \hat{i}_2$ ) but by only a small amount, the rest of the positive slope being made up by  $p$ . But a term premium is also consistent with curve (2) – investors expect future rates to fall slightly but this is exactly offset by capital risk aversion; it is even consistent with (3) – the market expects future rates to fall sharply but this is partially offset by risk aversion. And if risk aversion can modify any of the curves in Figure 16.5, it follows that it could modify any shape of curve dependent upon any set of expectations about the future level of interest rates.

Figure 16.6 shows a yield curve (1) determined solely by expectations (where investors think interest rates are already high but expect them to rise still further before falling in the long term), and a yield curve (2) where the same interest rate expectations apply, but the shape of the curve is modified by capital risk aversion.

As an explanation of the alleged upward bias in the term structure, the risk premium theory relies upon *capital* risk aversion in the bond market. Capital risk is not the only form of risk to which investors may be averse, however. For some investors, most likely institutions, fluctuations in *income* may be more important. Institutions such as life assurance companies,

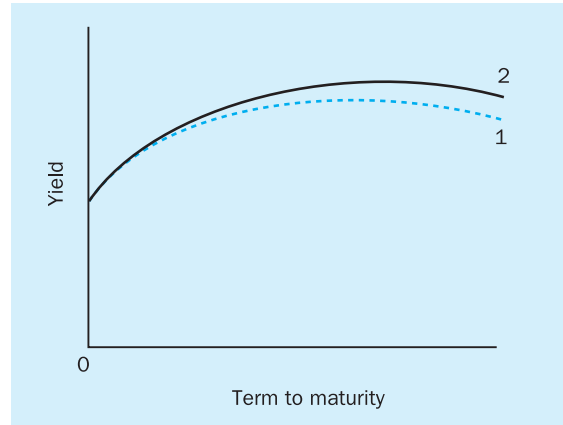


Figure 16.6 Adding a positive term premium

for example, have long-term liabilities in the form of the returns to investors guaranteed by virtue of the policy when it is issued or sold. These returns have to be earned from assets purchased with contributions which the company receives long after the contract was written. Clearly, at the time of purchase asset prices (yields) could be high (low). One way to limit the risk is to buy long-dated bonds when yields are high and hold them to redemption. **Income risk aversion** thus pulls in the opposite direction from capital risk aversion. In these circumstances, there is a systematic bias towards long-dated bonds. *Ceteris paribus* one would expect long-dated bonds to have a higher price (lower yield) than short-dated bonds, and the yield curve would tend to slope downwards.

There is no *theoretical* reason for capital risk aversion to dominate and thus for the term premium to be positive. Its sign, as well as its size, is an empirical matter.

### 16.5.3 Preferred habitat theory

Notice that risk aversion and the term premium theory require us to drop the implicit assumption of the pure expectations theory that the bonds are homogeneous except with respect to their term to maturity. Differences in period to maturity create different risk characteristics to which investors may be sensitive. Preferred habitat, and its more extreme version, market segmentation, theory takes heterogeneity so seriously as to argue that investors have distinct preferences for parts of the maturity spectrum.

For example, pension funds as well as life assurance companies are significant holders of long-dated bonds, while banks and building societies hold mainly shorts. This preference, ultimately related to the pattern of their liabilities, encourages a concentration of skill and expertise in the observation and analysis of ‘segments’ of the market in order to take advantage of arbitrage opportunities. Moving outside these segments may involve significant costs. The observation that balance sheet and operational pressures may cause investors to focus upon a particular part of the maturity spectrum led Culbertson (1957) to suggest a ‘Market Segmentation’ theory of the term structure and Modigliani and Sutch later (1966) to their ‘Preferred Habitat Theory’.

On both views, the shape of the yield curve will be influenced by the demand for and supply of bonds within each particular segment. Suppose, for example, that government took the decision to fund successive PSNCRs by issuing debt in the 7–10-year maturity range, everything else remaining unchanged. Eventually, we should expect to see the price of 7–10-year bonds fall relative to the price of longer and shorter debt, and yields would rise. *Ceteris paribus*, the yield curve would display a ‘hump’ in this maturity range. However, if we were to assume complete substitutability throughout the full maturity spectrum, as the expectations theory implicitly does, such a hump would never materialize. As prices began to fall (yields rise), investors from adjacent parts of the spectrum would switch out of (slightly) longer and shorter bonds to take advantage of the emerging higher yields. This in itself would limit the rise in 7–10-year yields but it would also lower the price (and raise the yields) of bonds in the adjacent parts of the spectrum. With complete substitutability, ripples of adjustment would spread along the whole curve, with the result that the whole curve would shift upward while retaining its original shape.

If, however, investors occupied a preferred habitat they would be reluctant to move from their chosen part of the spectrum. Resistance would not be total. We would expect some premium over yields in adjacent spectrums at which a movement would be triggered. (Indeed, our earlier argument that a premium may have to be paid to induce capital (income) risk

averters to hold long- (short-)dated bonds could be seen as special cases of preferred habitats.) The size of this premium will depend upon the strength of preference. In these circumstances, the continued issue of bonds in one part of the spectrum will cause a ‘hump’ to emerge while concentrated redemptions would cause a ‘trough’. The significance of the preferred habitat theory is that it presents the maturity spectrum as the sum of many segments each inhabited by investors whose preferences are derived from many influences (not just their attitudes to capital and income risk) and thus admits the possibility of a yield curve with any number of inflexions.

With complete segmentation, resistance to movement from the preferred habitat would be total and the ‘humps’ and ‘troughs’ correspondingly larger.

Once again, such behaviour can be combined with other influences. A market dominated by capital risk averters might expect short rates to fall progressively over the next 15 years, but the yield curve could show a trough in the 12–14-year range if, in a segmented market, such bonds were in particularly short supply.

## 16.6 Characteristics of the bond markets

Fixed-interest securities are issued in all countries by a wide range of institutions wishing to raise funds for longer than one year. The list includes central governments, local or regional administrations, other public bodies and corporations<sup>8</sup> and private firms. Table 16.2 shows the value of bonds issued in selected markets, distinguishing by broad category of issuer. It shows, in particular, the size of the US bond market, relative to its European counterparts.<sup>9</sup>

Table 16.2 tells us nothing about how these stocks have come about. Governments, as a rule, run budget deficits, which guarantees a continuous flow of new issues from the public sector. Such a persistent flow of new issues, we noted earlier, causes the stock (supply) to expand continuously. But there is also a net flow of new issues from firms, as existing firms expand and new firms are created. One factor which has been particularly relevant to the new issue of corporate bonds in recent years has been the behaviour of interest

<sup>8</sup> Except in the UK where public sector bond issues are centralized in the government’s public sector borrowing requirement (PSNCR).

<sup>9</sup> The yen bond market is also very large, much closer to the US than to European equivalents.

Table 16.2 Bond issues and turnover

Exchange	No. of bonds outstanding, end March 2004			New issues <sup>1</sup>	Turnover <sup>2</sup>
	Public sector	Private sector – domestic	Private sector – international	all	all
Copenhagen	142	2,058	70	20,677.6	219,543
Deutsche Börse	1,013	5,185	1,324	251,190	74,347
Euronext <sup>3</sup>	3,321	n/a	n/a	n/a	n/a
Italian exchanges	116	294	67	n/a	47,787
London Stock Exchange	139	5,390	4,389	120,612	572,085
Oslo Børs	285	524	9	4,142.5	25,332
Spanish exchanges	382	2,382	62	n/a	787,558
Stockholmbörsen	122	1,282	49	n/a	327,749

Notes: <sup>1</sup> Funds raised in 2004 Q1, in €m; <sup>2</sup> Turnover year to end March 2004, €m; <sup>3</sup> Amsterdam, Brussels and Paris.  
Source: Federation of European Stock Exchanges, *Monthly Factsheet*, March 2004.

rates. During the 1970s high and volatile interest rates seem to have discouraged firms from entering into long-term fixed-interest commitments and temporarily the new issue of corporate bonds slowed to a trickle in most European markets. (These were the same conditions that forced several governments to experiment with index-linked and variable rate bonds in order to fund their deficits.)

### 16.6.1 Primary markets

In most financial centres, the methods for making *new* issues of corporate bonds are the same as for the issue of new ordinary company shares. In the UK, for example, corporate bonds may be the subject of a ‘public offer for sale’ either at a fixed price or by auction. Alternatively, they may be issued by a ‘placing’. In this case the institution responsible for issuing the bonds places them directly with investors with whom it already has contacts. The institution responsible for handling the issue will be a merchant bank or a securities dealer.

The methods for making new issues of government bonds, however, are often different. This is because the sale and redemption of government bonds is an important instrument of monetary policy and the government needs to be certain that its wishes can

be made quickly effective in the market for government bonds. In 1998 the responsibility for managing government debt in the UK was transferred from the Bank of England to the newly formed ‘Debt Management Office’, an agency of the UK Treasury. In the UK, the DMO is responsible for the terms on which new bonds are issued and for the timing of such issues. The traditional method, still used, is the sale by tender in which the DMO offers a specified quantity of stock for sale on a particular day at a minimum price and invites bids. If the offer is undersubscribed, all bids are accepted; if it is oversubscribed, the highest bids are accepted but at a common price – usually the minimum bid price necessary to clear the sale.<sup>10</sup> If the offer is undersubscribed, the DMO retains the unsold stock and releases it onto the market subsequently, when conditions permit. Stock issued in such a way is known as *tap stock*.

The second method of issue involves the auction of stock, in which no minimum price is set. The stock is sold to the highest bidders at the price they bid.<sup>11</sup> This is a method which was first used in 1987 and represents a distinct stage in the evolution of debt management policy. From the point of view of the money supply and credit aggregates, sales by auction have the advantage that the issuer can set the volume, knowing that it will be fully subscribed, since the price will adjust to ensure that this is so. Thus, the desire to

<sup>10</sup> This is an example of the striking-price auction we first met in Section 15.3.

<sup>11</sup> An example of the bid-price auction of Section 15.3.

sell a given volume of stock consistent with targets for the money supply can generally be met. With a sale by tender the price is set, with the result that the volume of sales becomes uncertain. The two methods simply illustrate the age-old principle that one can control the price or the quantity, but not both.

The third method of issue is for the DMO to ‘buy’ the stock itself and to release it to the market as conditions permit: the ‘tap’ method of issue.

In Germany, government bonds are generally ‘plain’ or bullet bonds, and there have inevitably been large issues following the reunification of Germany in 1990. Long-term government bonds (‘Bunds’ – see Table 16.1) are issued in three ways. A tranche of any new issue is offered initially at a fixed price to a ‘Federal Loans Syndicate’ of designated financial institutions. The remainder are then subsequently sold at auction to anyone who cares to bid, while the *Bundesbank* retains a small proportion for future monetary policy operations. Medium-term bonds (‘Bobl’s’) are sold to a network of financial institutions as market conditions permit, rather in the way of the Bank of England tap method. The short-term *Bundesschatzanweisungen* are sold by auction. Auctions of German bonds are bid-price auctions, conducted at regular intervals.

In France, the standard method of issue is by competitive bid-price auction to designated ‘primary dealers’ (*Spécialistes en Valeurs du Trésor*) according to a regular timetable.

As the figures in Tables 16.2 and 16.3 show, the Italian bond market is dominated by government bonds, reflecting Italy’s long history of public sector deficits. Even more than other systems, therefore, the Italian bond market has to be able to cope with large and frequent government bond issues in an orderly way. Dealers in bonds are divided into three groups (‘dealers’, ‘primary dealers’ and ‘specialists in government bonds’) according to the scale of their commitment to make markets in government bonds and to take up new issues. New issues are offered to the latter two groups who are invited to bid in a marginal (‘strike-price’) auction. In return these dealers have preferential access to the Bank of Italy and are members of the ‘MTS’, a computerized market for the wholesale trading of government bonds. This market accounts for about 95 per cent of trading in government bonds compared with the Milan stock exchange where retail trading accounts for the remainder of trading in government bonds.

## 16.6.2 Secondary markets

When it comes to trading *existing* bonds, markets can be classified in a number of ways depending upon the way in which the trading is carried out. Figure 16.7 provides a schematic typology, with a selection of bond and equity markets allocated to the type of market which they most closely resemble. Unfortunately for us, the picture is confused by the use of multiple terms with the same meaning.

As the figure shows, the most basic distinction is between **matching** and **dealer** markets. For reasons we shall see in a moment, matching markets are sometimes described as ‘order-driven’ or ‘auctioneer’ markets while dealer markets are sometimes called ‘quote-driven’ markets. In matching/order-driven/auctioneer markets there is a further distinction between *continuous* and *call* (or ‘batch’) markets. (Dealer/quote-driven markets are always continuous).

In matching markets, trades take place when dealers can match orders to buy and orders to sell. Hence they are responding to ‘orders’ and in trying to find a price that will match the maximum number of buy and sell orders they are acting very much like traditional ‘auctioneers’. The matching process may be continuous or it may take place at specified times. As Figure 16.7 shows, the majority of bond (and equity) markets are matching markets and the majority of these work on both a continuous and a call basis. There is a call auction at the beginning of the day in which all orders accumulated since the last close of trading are executed, followed by continuous trading

<b>Dealer (‘quote-driven’)</b>	NASDAQ
<b>Matching (‘order-driver’ or ‘auction’)</b>	Hong Kong Zurich Paris Madrid Frankfurt Milan Toronto
<b>Mixed</b>	London Stock Exchange Tokyo Amsterdam New York

Figure 16.7 Security market trading systems

throughout the day. Buyers and sellers can normally specify with their order whether they wish it to be exercised immediately or at the next call. Notice that the system does not depend upon auctioneers holding their own inventories. There is no need since they only ‘buy’ from a seller when they simultaneously ‘sell’ to a buyer.

By contrast, in a dealer market, the dealer ‘makes’ a market by holding his own inventories of stocks and announces (continuously) a price at which he is prepared to buy and sell (rather like a dealer in second-hand cars or antiques). The picture here is one in which those who wish to buy or sell know in advance what price is available and they are responding to that price. This is why a dealer market is described as a *quote-driven* market.

What consequences follow from these different structures? As a rule, call (or batch) markets are cheaper to operate than continuous markets. The obvious drawback, however, is that prices are established only at discrete intervals and price changes can be sharper when the trades are called than they would be in continuous markets. On the other hand, although pricing is continuous and large volume deals can be done at low unit costs, continuous markets and dealer markets especially are expensive to operate. As we said above, major financial markets tend to be of the continuous kind. In the light of our previous point it is worth noting that a continuing criticism of the London Stock Exchange since its major reforms in 1986 has been its inability to provide a cheap service for small to medium-sized trades, and that this contrasts sharply with a steep decline in the unit cost of large trades.

The costs of buying and selling securities are twofold. Firstly dealers may charge a commission. This is usually calculated as some percentage of the value of the transaction of the deal, subject to some minimum and maximum figure. (It is these minimum and maximum thresholds that lead to low unit costs for large deals and discriminate against small investors.) In addition, investors will normally face a ‘bid’ price, at which the dealer will buy, which is below the price at which the dealer will sell or ‘offer’ securities. One measure of the quality of a market, as we shall see in a moment, is the narrowness of the bid–offer spread around the equilibrium price.

There are other consequences too – in the speed with which prices change and the causes of price changes. To understand these differences we need firstly to distinguish between *information traders* and *noise* or

*liquidity traders*. Information traders are investors who buy and sell securities in order to profit from what they think is their superior information about the securities (or their superior interpretation of information). Noise or liquidity traders are those who trade for any other reason. As a rough approximation we might regard information traders as the ‘professionals’. They are the investors who make the best use of available information about the security’s fundamental value. Information traders use information to price bonds according to the principles set out earlier in this chapter and they value equities according to the dividend discount models in the next chapter. If we jump to Chapter 26, it is information traders who make financial markets informationally efficient. By contrast, noise traders buy and sell in response to their own view about where the security’s price is going next, *whatever the basis of that hunch may be*. We should not dismiss them as ‘amateurs’ or suggest that they are necessarily foolish. ‘Noise trader’ is a category that would include the technical analysts or ‘chartists’ described in Section 17.3.

The reason we make the distinction here is that information traders have a crucial role in dealer markets. Recall that in a dealer market, the dealer stands ready to buy and sell at a quoted price. Information traders give dealers a strong incentive to set the correct price (correct in the sense of reflecting all relevant information). If dealers did not do this, information traders would have an advantage which they would be able to exploit at the dealers’ expense, given the commitments that dealers have to make and stand by. Suppose, for example, that a trader believes, in the light of carefully studied information, that a security trading for \$4.90 is worth \$5. Let us assume that he buys it from a dealer, its price subsequently rises to \$5, and he sells it back to the dealer. His 10 cent profit is made at the dealer’s expense. It is because dealers must hold inventories of stocks and deal on demand that they must continuously make the best prices. Thus prices will change quickly and *they will change in response to information rather than trades*. In dealer markets, prices may change even when no dealing takes place.

By contrast, prices in auctioneer markets change *only* in response to trading. Information is relevant to market prices only in so far as it causes people to wish to buy and sell, and only then when it causes a liquidity imbalance, an excess of buy orders over sell orders or vice versa.



In most financial centres, secondary trading in corporate bonds is carried out by the same dealers in securities that make markets in ordinary company shares. (We say more about these in Section 17.5.) As a general rule, however, the stock of corporate bonds and the trading in them is very much smaller than that of equities. (Bond markets are large overall because of the accumulation of government bonds.) One consequence is that the bid–offer spread is often much larger than it is on the equities traded by the same firms and certainly much larger than the spreads on government bonds being traded in the same market.

As with new issues, and for the same reason, secondary trading in government bonds is usually subject to arrangements which are rather different from those applying to corporate bonds. Markets in government stock are frequently made by the same firms that deal in equities and bonds but they will be subject to separate and additional regulation by the central bank. In the UK, for example, although any securities dealer can in theory make a market in government stock, since the ‘Big Bang’ reforms of 1986, the market for government stock has been dominated by the ‘gilt-edge market makers’ (or GEMMs). They hold government stocks and deal on their own behalf but also act as clients for brokers.<sup>12</sup> The reason for this domination is that, being ‘recognized’ by the Bank of England, they enjoy certain advantages. These are: (1) borrowing facilities at the Bank of England; (2) access to inter-dealer brokers;<sup>13</sup> (3) a direct dealing relationship with the Bank of England; (4) a facility for making ‘late’ bids at auctions.

In return for all this, there are considerable obligations. Firstly, while a GEMM may very likely be part of a securities dealer making markets in all types of stock, it must be separately established with its own capital. (In December 1996 the Bank of England announced plans to lift this requirement.) Secondly, GEMMs may not deal in equity shares and while they may deal in other fixed-interest securities these must not be convertible into equities. Thirdly, they agree to make ‘continuous and effective two-way prices’ at which they are committed to deal up to a specified bargain size.

Fourthly, the size of transactions and the risk exposure that a GEMM can accept are subject to regular review and discussion with the Bank of England. (The December 1996 announcement envisaged an easing of the capital adequacy requirements in future.)

Since GEMMs are members of the London Stock Exchange, all of these obligations and regulations are additional to the conditions laid down for membership. Indeed, when we say that in the UK ‘most securities are traded on the London Stock Exchange’ it is only the fact that GEMMs are members and subject to its rules that gives this statement any sense today. Before 1986, when all securities dealing took place in one physical location, it was literally true. Brokers would make their way to one jobber for the ordinary shares of British Petroleum and then to another jobber for ‘Treasury 9% 2008’, as their clients required. But like (virtually) all securities dealing in London since 1986, the gilt-edge ‘market’ is screen-based and the dealers, rigidly demarcated from other dealers in other securities as we have just seen, are located in offices dispersed through the City of London.

As we explain in Section 17.5, one of the objectives of the Big Bang reforms was to increase the size and capital resources of market-making firms in the London Stock Exchange in order to make its services more competitive with those of other financial centres. One way of assessing the changes in the quality of a market is to look at transactions costs. Before 1986, commissions on average size deals, of £0.5–1m, ranged between £100 and £250. Since the Big Bang, such commissions have disappeared and, furthermore, bid–offer spreads have also narrowed from about 0.125 per cent to 0.0625 per cent for short-dated stocks and from 0.25 per cent to 0.125 per cent for long-dated stocks.<sup>14</sup>

### 16.6.3 Reading the *Financial Times*

One of the most comprehensive bond market information services readily available to the general public is provided by the *Financial Times*, in its UK and European editions.

<sup>12</sup> An illustration of the ‘dual-capacity’ role which became common in London after 1986. See Section 17.5.2.

<sup>13</sup> Inter-dealer brokers (IDBs) are intermediaries who buy and sell stock from and to GEMMs in conditions of anonymity. This enables a GEMM which has purchased (for example) a long line of one particular stock to sell parts of it on to other GEMMs without their knowing that it has this large holding and deliberately lowering their bid prices. In so far as the IDB system makes it easier for GEMMs to trade large blocks of stock without dramatic effects on prices, IDBs contribute the market’s ‘depth’ – a term which is explained in Section 17.5.2.

<sup>14</sup> That is, from 4 to 2 ‘ticks’ and from 8 to 4 ‘ticks’ respectively.

In the UK edition, most of the relevant information is provided on the page headed ‘Currencies, Bonds and Interest Rates’. The page includes the table showing prices and yields for UK government bonds which we included in Box 16.6. Another table shows the prices, yields and changes in both, for ‘Government Benchmark Bonds’ in a wide range of countries. Data for a short- and long-term bond is usually given and this provides an indication of the short- and long-term risk-free rates of interest in these countries. There is also a table headed ‘Global Investment Grade’ which shows similar information for a range of corporate bonds. A further table shows the premium that can be earned on a range of ‘Bond Options’ in each of the world’s major currencies and another shows the price of ‘Bond Futures’ in various currencies.

The remaining data, which we reproduce in Box 16.7, is of two kinds. The first relates to the UK bond market, mainly in the form of a series of price indices. The upper two-thirds of this table, for example, concentrates on UK government bonds. All indices containing *FT-Actuaries* in their title (and there are several of them as we shall see in Chapter 17) are produced jointly by the *Financial Times* and the Institute of Actuaries (in London) and the Faculty of Actuaries (in Scotland). Broadly speaking, the Actuaries are responsible for the design of the index (deciding what

to include and what to omit, for example) while the *FT* collects the daily price information and computes the index value. The first column is an index of prices for bonds of various maturities, distinguishing between ‘straights’ and ‘index-linked’ and the *percentage* change in that index since the previous day. The index represents the movement in price of a portfolio constructed of equal proportions of all UK government stocks and the base year is 1975. It is continually adjusted for new issues and redemptions and for movements of individual stocks from one maturity band to another.

To the right of the price data is a column showing the percentage change in price in the previous day’s trading (averaged across all the bonds in that maturity bond). The next column shows the interest accrued since the last interest payment (again averaged across all bonds in that group). Two columns further on we see a large figure which shows the value (in index number form) now of a bond portfolio if it had been bought in 1975 and all the coupon payments reinvested. The next two columns show the average redemption yield for each group followed by the average duration. The final column shows the importance of each group as a percentage of the total stock of government bonds.

The second set of data, in the lower part of the table, refers to yields or rates of return. Again, this is averaged over a number of bonds so as to allow

**Box 16.7 UK BONDS – FTSE Actuaries Government Securities**



Price Indices																		
UK Gilts	Fri	Day's	Accrued	xd adj	Total	Duration	%	Index-linked	Fri	Day's	Accrued	xd adj	Total	%				
	Nov 19	chge	%	interest	ytd	Return	Yield		Years	Weight	Nov 19	chge	%	interest	ytd	Return	Weight	
1 Up to 5 years (11)	108.03	+0.06	2.00	4.91	1596.88	4.60	2.47	34.15	1 Up to 5 years (2)	256.61	+0.13	0.76	6.61	1555.30	13.92			
2 5–10 years (8)	158.34	+0.16	2.10	7.23	1750.62	4.68	5.96	22.45	2 Over 5 years (7)	297.78	+0.45	1.87	6.79	1852.39	86.08			
3 10–15 years (3)	172.11	+0.22	2.87	8.15	1887.96	4.68	8.31	11.87	3 5–15 years (3)	276.25	+0.30	1.86	6.44	1709.86	43.98			
4 5–15 years (11)	161.97	+0.18	2.34	7.58	1787.59	4.68	6.77	34.33	4 Over 15 years (4)	319.91	+0.60	1.86	7.06	1996.90	42.10			
5 Over 15 years (6)	220.63	+0.38	4.30	6.76	2022.84	4.52	13.87	30.89	5 All stocks (9)	290.78	+0.40	1.69	6.71	1814.20	100.00			
6 Irredeemables (2)	334.93	+0.77	6.28	8.54	2548.28	4.51	22.27	0.64										
7 All stocks (30)	153.04	+0.21	2.67	6.35	1771.46	4.58	7.77	100.00										
..... Inflation 0% .....      ..... Inflation 5% .....																		
Yield indices																		
	Nov 19	Nov 18	Yr ago	FT Fixed Indices			Nov 19	Nov 18	Yr ago	Real yield	Nov 19	Dur yrs	Nov 18	Yr ago	Nov 19	Dur yrs	Nov 18	Yr ago
5 yrs	4.66	4.68	4.88							Up to 5 yrs	2.29	3.15	2.33	2.28	1.40	3.17	1.42	1.19
10 yrs	4.69	4.71	5.02							Over 5 yrs	1.89	12.10	1.92	2.26	1.65	12.20	1.69	2.02
15 yrs	4.64	4.66	4.98	Govt. Secs (UK)	102.23	102.03	99.42			5–15 yrs	2.06	8.34	2.10	2.31	1.72	8.37	1.75	1.96
20 yrs	4.57	4.60	4.93	Fixed Interest	138.77	138.54	137.56			Over 15 yrs	1.79	16.18	1.83	2.23	1.62	16.28	1.65	2.06
Irred	4.51	4.54	4.92							All Stocks	1.90	10.83	1.94	2.26	1.64	10.96	1.68	2.01

Stocks with 0–1 year to maturity are excluded from the yield & duration indices.

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Source: *Financial Times*, 20/21 November 2004.

investors to draw general conclusions. Notice though that yields are averaged over bonds with a specific term to maturity ('5yrs', '10yrs' etc.) rather than over a range of maturities. At the left-hand end of the table we see the latest redemption yields and the yields on the preceding day and a year earlier.

At the right-hand end of the table, just as we have price index data for index-linked bonds in the upper part of the table, we have 'real yields' for these bonds. At the beginning of this chapter, we explained that the coupons and maturity values of index-linked bonds were each adjusted in line with inflation. Thus a '2.5% index-linked' bond would pay £2.50 plus any adjustment required by inflation. The intention behind this is to guarantee investors a *real* return of 2.5 per cent which is roughly the long-run real return on low-risk assets in the UK. However, there are two reasons why the rate of inflation will affect the real yield. The first is that the formula for index-linking uses the retail price index with an eight-month lag (so the bond is unprotected for the last eight-months of its life). The second is that changes in the market price of index-linked bonds will affect real returns (as with all bonds). If, say, index-linked bonds become popular (perhaps because of fears of rising inflation) then their prices will rise and investors will get a lower nominal and real return. The data in the bottom right of our table tell us what the real yield will be, given current prices, if inflation is 0% and 5% for the life of the bonds.

## 16.7 International bonds

In addition to issuing bonds in domestic currency in the domestic bond market, large borrowers may make use of international bond markets. Until recently, it was common practice to distinguish between two types of international bonds. The first are known as Eurobonds. These (like all 'Euro-' instruments) are bonds issued in a currency which is different from that of the market in which they are issued. A Eurodollar bond, for example, must be issued in a non-US market. The second type are known as foreign bonds. These are bonds denominated in the currency of the market in which they are issued, but they are issued by non-residents. Box 16.8 summarizes these classifications.

The first Eurobond was issued in 1963 but growth of the market was subdued until the 1980s. Thereafter, the Eurobond market expanded very rapidly, followed by the market for foreign bonds. It was the spectacular

### Box 16.8 A taxonomy of bonds

	Bond issues	
	By residents	By non-residents
In domestic currency	A	B
In foreign currency	C	D

A = domestic bonds; B = traditional foreign bonds;  
 C + D = Eurobonds; B + C + D = international bonds  
 Source: *International Banking and Financial Market Developments*, Basel, Bank for International Settlements (BIS 2002), p. 21, the full publication is available for free on the BIS website, [www.bis.org](http://www.bis.org)

growth of the Eurobond market between 1980 and 1995, together with some special characteristics of the bonds, that made the Eurobond phenomenon a case worthy of special study. In recent years, however, there has been considerable convergence in the characteristics of these bonds and of the markets in which they are traded and it now makes more sense to analyse the success of the international bond market as a whole. We begin with a look at the special case of Eurobonds. We then look at arguments for treating all international bonds together and finally provide some figures and analysis of the international bond markets.

There are many reasons behind the growth of Euromarkets. Like other financial instruments, the attractiveness of Eurobonds to issuers and to holders depends in the short run upon yield relativities. Davis (1992) offers a detailed analysis of short-run variations in Eurobond issues which features these relativities *inter alia*. The longer-run trend, however, is the result of several longer-term factors. The oldest of these goes back to the late 1950s and 1960s and lies in the reluctance of East European countries to hold dollar-denominated assets in the USA for fear that they might be frozen if relations deteriorated sharply enough in the depths of the Cold War. A further reason was the succession of large US current account deficits during the 1970s which led to an accumulation of dollar holdings in Europe. However, most of the explanation lies in various fiscal and other regulations in domestic markets which encouraged borrowers and lenders to find ways of trading which were subject to lighter control. This does not mean that there are no restrictions on Eurobond dealing. The International Securities Markets Association (ISMA) has drawn up rules and procedures but we shall see that the heavier regulation of domestic markets provides several incentives to

### Box 16.9 Regulation stimulates Eurobond markets

There are numerous regulations applying to domestic markets which have encouraged lenders and borrowers to find alternative locations for trading. Amongst those relevant to the Eurobond market are as follows:

- ‘Regulation Q’ in the USA limited the interest that could be paid on time deposits. This encouraged US residents to keep dollars outside the USA and thus led to the growth of Eurodollar deposits. With time, holders of deposits looked for other dollar assets into which they could diversify without returning the dollars to US regulation.
- Under legislation introduced in 1963, US corporations were restricted in the amount of capital they could raise domestically in order to fund their overseas operations.
- In most countries, interest on bonds is paid net of tax to domestic holders and withholding tax is deducted on interest paid to overseas bondholders. Eurobonds pay tax gross.
- In most countries, issuers of domestic bonds are required to maintain a register of owners. The cost of maintaining the register is a disadvantage to the issuer and being identified as the owner of bonds is a disadvantage to some bondholders.
- Domestic bond markets usually impose stringent accounting and other disclosure conditions on bond issuers in order that their bonds may be listed (and therefore traded) on recognized securities exchanges. Again this imposes costs but it also slows down the issuing process, exposing the firm to the risk of changes in financial conditions between the decision to issue and raising the funds.

issue Eurobonds. We have highlighted the regulatory stimuli responsible for its growth in Box 16.9.

The main influences on the currency of denomination are the demands of international trade together with a desire for denomination in ‘strong’ currencies. Therefore, the predominant role of dollar Eurobonds followed by denominations in Japanese yen and Deutschmarks is hardly surprising.

Just as the development of the whole Eurobond market can be seen as an innovative response to regulations governing other long-term financial instruments, there were notable innovations within the market. The dominant type of Eurobond remains the ‘straight’ fixed rate (‘straight’ or ‘bullet’) bond (whose price will be determined in the way that we saw earlier in this chapter). As a proportion of total issues, ‘straights’ have usually accounted for between 60 and 80 per cent. However, the 1980s saw the development of the **floating rate note** (FRN) and a family of equity-related bonds. At various times in the 1980s FRN accounted for nearly 40 per cent of total Eurobond issues while equity-related Eurobonds reached a peak of 30 per cent of issues in 1989. Years of high equity-related issue have tended to be years of low FRN issue and vice versa, leaving the dominant position of straights untouched. FRNs are bonds whose coupons are set by adding a mark-up to some variable benchmark interest rate, often Libor or the interbank rate in some other centre. Coupons are paid at six-monthly intervals and are re-set each time in the light of changes in the bench-

mark rate. Equity-related bonds are bonds which give their holders some future access to the issuer’s equity stock. **Convertible Eurobonds**, like convertible domestic bonds, give the holder the right to convert into the equity stock of the issuer at some specified time in the future and on terms which are set out at the time of issue of the bond. Alternatively, bonds may have **equity warrants** attached. Warrants give the bondholder the option to convert to equity on specified terms but, unlike convertibles, the warrants are securities in their own right and can be detached and sold separately.

The main issuers of Eurobonds are sovereign governments, banks (including building societies in the UK) and large corporations. In 1993, for example, 25 per cent of all FF $\epsilon$  Eurobond issues were made by *Crédit Local de France*, SNCF, *Crédit National* and the European Investment Bank, while two major issuers of DM Eurobonds were the UK and Italian governments, wishing to rebuild their DM reserves. The main holders are banks and large managed funds (life assurance, pension funds and unit and investment trusts in the UK).

The method of issue in the primary market has evolved markedly over time. At the moment (2004) the usual method is for an issuer of bonds (the borrower) to approach a **lead manager** for the issuer, usually an investment bank. The lead manager recruits additional banks to form a **syndicate**, within which some banks will be identified as underwriters and sellers. The function of the underwriters is to guarantee to buy the stock

at a set minimum price if it cannot be sold above this price by the sellers. The lead manager then buys the whole issue on terms previously agreed with the borrower and then distributes the bonds throughout the syndicate for onward sale to the public. In this arrangement, known as the **bought deal**, the risk (of failing to sell to the public at the anticipated price) lies with the lead manager and the underwriters. Since 1990 it has been common practice to superimpose upon this arrangement an agreement between members of the syndicate not to discount bonds when selling to the public until the issue has been completely disposed of. This is known as the *fixed price re-offer technique*.

The secondary market for Eurobonds centres on **reporting dealers**. These are usually a subdivision of a merchant bank or of a general securities dealer. Each reporting dealer makes a market in a subset of Eurobonds. The dealers are members of the ISMA (see above) and must submit every day a list of the bonds in which they are prepared to deal and the prices and quantities. The ISMA circulates this information publicly. Prices, however, are 'indicative' and not 'firm' as they would be for market makers in most domestic bonds. Reporting dealers can also deal amongst themselves using the facilities offered by inter-dealer brokers (see Section 16.6 above).

Although most European authorities insist that domestic issuers of Eurobonds use lead underwriters in their home country (so it can be said for example that SNCF issues Eurobonds 'out of Paris') London has become and remains the centre for the bulk of new issues. It also accommodates most secondary market trading. In recent years, and partly because of London's success in attracting such a large share of this rapidly growing activity, the question of what makes a financial centre attractive has begun to receive considerable attention (Grilli, 1989; Cobham, 1992).

In the case of London and the Euromarkets in general, the following factors appear to be of particular relevance. Firstly, dating from its long-established tradition as a financial centre, London has been able to offer a supply of well-trained labour and a supply of suitable premises concentrated within a relatively compact area. There is also a regulatory regime which is seen as being sympathetic to financial activity in its willingness to consult and in its determination to minimize turnover taxes and barriers to competition. Personal and corporate rates of taxation are now low by international standards. These regulatory benefits are reinforced by a stable political system which is

unlikely to produce sudden, radical change. Furthermore, the absence of exchange controls since 1979 has made London an attractive location for a wide range of international activity in recent years. More generally, English language and law are both widely used in international financial business. Fortuitous, but important, is London's position in a time zone which allows trading to run consecutively with the trading in the other two main international financial centres, Tokyo and New York.

Table 16.3 shows the rapid growth in the international bond market over the five-year period from 1998 to 2003. Looking at amounts outstanding, the compound annual growth rates for France, Germany and the UK are roughly 23, 30 and 27 per cent. Judged by the flow of new issues (net of redemptions) the growth rates are 29, 19 and 33 per cent.

Within these totals, the Bank for International Settlements estimates that Eurobonds accounted for about 65 per cent of the stock of international bonds outstanding in 1998 and that this fraction had fallen to about 45 per cent by 2003. This is a sharp drop and to bring about this scale of change in a stock suggests that the shift in the composition of the annual *flow* of new issues must have been very substantial indeed. This decline in the (relative) popularity of Eurobonds is just one of the reasons that the BIS gives for paying less attention to the Euro-/foreign-bond distinction.

Other reasons include the fact that many of the regulatory loopholes to which Eurobonds once gave access have diminished as the regulation of domestic markets has eased and bond market structures and regulations have converged. Box 16.10 summarizes the features of Eurobonds which, compared with foreign and domestic bonds, used to give them a special status. In recent years, however, many bond markets have eliminated withholding tax for foreign and domestic bonds and some have introduced the option of bearer status for domestic bonds. Furthermore, the break-up of the Soviet bloc and the decline in Cold War suspicions which had originally discouraged East European investors from holding dollar assets in the United States has removed another special attraction of Eurobonds. Taken together, these developments have made Eurobonds less 'special' and have made all classes of bonds closer substitutes, one for another. This is reflected in Eurobonds' declining share in the total of international bonds, referred to above.

What, in particular, has caused this dramatic expansion in international bond issues? International

**Table 16.3** International bond issues – by nationality of issuer (US\$bn)

	Amounts outstanding		New issues (net)	
	end-1998	end-2003	1998	2003
Denmark	29.3	37.4	-1.3	6.0
France	248.2	701.2	33.9	122.1
Germany	475.3	1810.9	92.9	218.0
Italy	109.1	513.3	14.6	86.3
Netherlands	167.9	533.0	35.0	77.8
Norway	29.7	61.8	6.4	9.1
Spain	76.2	385.9	21.7	101.5
Sweden	90.5	148.3	-5.4	12.8
United Kingdom	336.6	1038.7	42.4	190.3
United States	821.3	3007.9	280.8	260.9

Source: *Quarterly Review*, February 2000, and *Quarterly Review*, March 2004, Basel, Bank for International Settlements (BIS, 2000), the full publication is available for free on the BIS website, [www.bis.org](http://www.bis.org)

bonds are issued by firms, national governments, financial institutions and international organisations of many kinds. The easiest issues to explain are those made by firms which wish to borrow in a foreign currency in order to pay bills in that currency. We might therefore say that one motive behind the growth of the market is 'trade'. But in addition to firms wishing to finance current or capital spending there are investment institutions which are trying to get the best rate of return for themselves or on behalf of clients and to achieve the benefits from diversification across a wider range of assets than are available in the domestic market. These portfolio decisions will be particularly sensitive to interest rate differentials. Where investment institutions are concerned, there may also be a demand for foreign bonds arising from a desire to protect clients funds from domestic polit-

ical instability, high tax rates or the threat of future restrictions on the use of their capital.

But we know that interest rates fluctuate, and since the break-up of the Bretton Woods agreement in 1972 the same has been true for exchange rates. This suggests that there will be a speculative element in the issue of and demand for international bonds from borrowers and lenders who think that they will be able to profit from such movements. Conversely, some of the trade will reflect a hedging motive – a desire to avoid *losses* from exchange and/or interest rate fluctuations. Almost certainly, if we are looking for an explanation for the rapid growth of international bond markets we should focus on the portfolio and speculative/hedging uses of these bonds. It is unlikely to be coincidence that these markets took off at a time when interest and exchange rates were particularly volatile.

#### Box 16.10 Traditional distinguishing features of world bond markets

	Euro	Foreign	Domestic
Withholding tax	No	Yes	Yes
Form	Bearer	Bearer/Registered	Registered
Issue method	International syndic.	Domestic syndic.	Direct, auction or syndic.
Listing	London or Luxembourg	Local stock exch.	Local stock exch.
Trading	Over the counter (OTC)	OTC/local s.e.	OTC/local s.e.
Settlement	Euroclear/Cedel	Local	Local

Source: *International Banking and Financial Market Developments*, p. 23, Basel, Bank for International Settlements (BIS, 2002), the full publication is available for free on the BIS website, [www.bis.org](http://www.bis.org)

## 16.8 Summary

'Bonds' are securities which enable borrowers to raise funds for long periods but leave lenders with the convenience of being able to sell their loan if they need to retrieve their funds. As a general rule, bonds pay a fixed rate of interest and have a fixed period to maturity. These are the 'plain' bonds on which we concentrated in this chapter. The price of bonds depends upon the coupon which they pay, upon the current level of market interest rates and the residual period of the bond's life. The prices of bonds with a long residual maturity are generally more interest-sensitive than the prices of short-dated bonds. As with all assets, the yield on bonds varies inversely with their price. There are several measures of bond yields.

If we plot the yield on bonds against the residual period to maturity, we often observe a pattern. This distribution of yields is known as the term structure of interest rates and the plot is known as a time-yield curve. There are several theories of what determines

this pattern of yields. The expectations theory is particularly interesting since it says that current long-term rates are the average of expected future rates. It is an interesting theory since, if it is true, *and* if expectations are generally correct, then we can derive implied future short-term interest rates and the derivations will generally be correct.

Once issued, bonds are traded in a secondary market, in which there exist a variety of trading arrangements. As a general rule, trading in bonds is carried out by firms which also deal in company shares and other securities, though dealers in government bonds are often subject to regulations which are additional to those of the stock market in which they work. The market for government bonds is generally much larger than the corporate bond market. Most European markets have recently embarked on a series of reforms similar to those that occurred in London in 1986. One significant difference, however, is that European centres have opted for 'continuous auctioneer' ('order-driven') rather than 'continuous dealer' ('quote-driven') markets.

## Key concepts in this chapter

Eurobonds	Holding period yield
Foreign bonds	Default risk
Original maturity	Reinvestment risk
Residual maturity	Capital risk
Par value	Credit rating agencies
Coupon	Junk bonds
Coupon rate	Duration
Bearer bonds	Term structure of interest rates
Zero coupon bonds	Time-yield curve
Straight bonds	Term premium
Debentures	Capital risk aversion
Convertible bonds	Income risk aversion
Index-linked bonds	Preferred habitat
Floating rate notes	Expectations theory of the term structure
Bulldog bonds	Market segmentation
Accrued interest	Floating rate notes
Dirty price	Equity warrants
Clean price	Convertible Eurobonds
Market price	Syndicate
Ex dividend	Lead manager
Current, running or interest yield	Bought deal
Simple yield to maturity	Reporting dealer
Redemption yield	

## Questions and problems

- 1 Distinguish between clean and dirty bond prices and explain how each is calculated.
- 2 A bond with four years to maturity and a coupon of 7 per cent has a current market price of £102.50. What is: (a) the current yield; (b) the simple yield to maturity; (c) the redemption yield?
- 3 A 12 per cent bond will be redeemed at par on 1 March 2009. If the yield to maturity on 2 March 2004 is 8 per cent, what is the price of the bond?
- 4 Other things being equal, the prices of long-dated bonds are more sensitive to changes in interest rates than are the prices of short-dated bonds. Why is this the case?
- 5 Outline the possible effects upon bond prices of each of the following events and explain your reasoning. (Assume that each occurs in isolation from the others.)
  - (a) the current account shows an unexpectedly large deficit;
  - (b) in the midst of a recession, the central bank announces a small cut in interest rates;
  - (c) three months before an election, with the economy growing strongly, the government announces a cut in income tax;
  - (d) an increase in the central government borrowing requirement which was widely expected;
  - (e) the price of oil falls unexpectedly;
  - (f) the *Bundesbank* announces an increase in money supply which exceeds the target range.
- 6 If the current (redemption) yield on bonds with one year to maturity is 6 per cent, while the yield on bonds maturing in three years is 8 per cent, what does this imply about one-year yields in three years' time?
- 7 What assumptions have you had to make in Question 6 in order to obtain a forecast of the future spot rate?
- 8 In what circumstances might the shape of the yield curve tell you something about (a) the future level of interest rates and (b) the future rate of inflation?
- 9 Why might the yield curve incorporate a *positive* term premium.
- 10 Who are the main participants in bond markets?
- 11 Why is it possible for governments to run repeated budget deficits without causing bond yields to rise continuously?

## Further reading

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*What you will learn in this chapter:*

- The types and characteristics of ordinary company shares
- A variety of approaches to evaluating the market price of shares
- Why share prices behave as they do
- The characteristics of equity trading arrangements, their main participants and recent developments
- How to read, interpret and analyse equity market reports

## 17.1 Introduction

For many people, the phrase ‘financial markets’ means equity markets. This is curious because we shall see that in many financial centres the amount of trading in equities, measured by value, falls a long way short of trading in bonds and a long way short of trading in foreign exchange. And yet general news broadcasts on radio and television invariably quote the latest movement in some index of equity prices, when they would not consider for a moment broadcasting information on bond yields or money market interest rates, both of which have considerable relevance to everyone.

There are several reasons for the disproportionate amount of popular attention focused on equities. Firstly, it is equity markets that have provided the most spectacular fluctuations in the history of financial markets. There are many examples of spectacular crashes (preceded by major booms of course) including: the South Sea Bubble of 1720; the Mississippi Bubble of 1719–20; the Wall Street Crash of September 1929 and the Crash of October 1987.<sup>1</sup> Secondly, it may simply be that there is more ‘news’ behind company shares. Most bond markets are dominated by government bonds and their prices are driven, as we have seen, by whole market events such as changes in interest rate expectations. The price of individual corporate bonds can be affected by company-specific events, but the impact will always be limited because of the fixed coupon payment and the preferential claim that a bondholder has on a firm’s assets. It is ordinary company shares that hold out the prospect of truly large gains and losses. Company share prices are continually affected by company-specific events and these can be quite colourful, ranging from the company chairman who describes his own products as rubbish, or drowns at sea with the workers’ pension funds, to the discovery by a research team of a treatment for AIDS. Since ordinary shareholders have a residual claim on profits and profits can range from the negative to the infinite, the potential for losses and gains is correspondingly large. Thirdly, since shareholders are the legal owners of firms, the buying and selling of shares involves the transfer of ownership. Sometimes that transfer itself is news, especially if

one firm is making an unwelcome bid to take over another, since mergers and takeovers may involve ‘rationalizations’ and redundancies. These in turn can affect employees of the two firms and perhaps even a regional economy if a large plant is closed.

A fourth possible reason is that many European governments have followed the policy begun 30 years ago in the UK of privatizing hitherto state-owned firms. To take just a few famous examples, since 1993, the German government has privatized Lufthansa and Deutsche Telekom, France has privatized Banque National de Paris and Elf Aquitaine. In Italy, Credito Italiano and Banca Commerciale Italiana are now in private hands. The two main reasons behind these privatizations are firstly that state-owned firms providing goods and services which are already provided by the private sector are less efficient, and secondly that firms in private ownership are probably more likely to take advantage of cross-border merger and amalgamation opportunities that will arise as the European market becomes more integrated. However, there may be another reason. We shall see below (Section 17.5) that all continental stock markets were very concerned in the 1990s about losing business to London since the reforms that took place there in 1986. One certain effect of these privatizations was to increase sharply the size of domestic markets in securities. For example, the French privatization programme, relaunched in 1993, was planned to raise FF280bn which was the equivalent of 10 per cent of the value of equities quoted on the Paris Bourse in 1993. Furthermore, like the UK Thatcher governments in the 1980s, the French government linked privatization to attempts to popularize individual direct shareholding. 1992 saw the introduction of the ‘*Plan d’Epargne en Actions*’ which, like personal equity plans in the UK, enabled ‘small’ investors to invest in shares without becoming liable to capital gains and income tax; in 1993 ‘Balladur bonds’ were introduced to enable savers to buy a fixed interest rate instrument which would be convertible later (in 1997) into the shares of privatized firms. These incentives were also linked to the development of the domestic stock market through the argument that small investors would always prefer to trade in their ‘home’ exchange. The scope for encouraging individual direct investment is

<sup>1</sup> A useful survey and discussion of these events is contained in Garber (1990). A much more detailed but highly readable account of the 1929 crash is in Galbraith (1961) while the *Bank of England Quarterly Bulletin*, February 1988, contains an article which describes and offers some explanation of the events of 1987.

considerable: direct investment in equities is limited to about 5 per cent of households in France and Germany, compared with 20 per cent in the UK (and 40 per cent in the USA). It follows from this that in continental Europe, the ownership of company shares is even more concentrated in the hands of financial institutions than it is in the UK. In particular, it is banks that are major shareholders, which is a further contrast with the UK where banks hold only short-dated fixed interest securities and shares are held largely by pension funds, long-term insurance companies and mutual funds.

In this chapter, the next section outlines the characteristics of ordinary company shares. Section 17.3 explains a number of approaches to valuing shares, concentrating upon dividend discount models but touching briefly on other methods, including technical analysis. In the course of these discussions it will become apparent that the events that can cause people to change their view of the appropriate value of company shares are many and varied, compared with those that affect bonds, for example. For this reason, we include a section (17.4) which shows how a selection of typical events can be connected with changes in share prices – individually and in the aggregate, in the short and the long run – using the formal models that we have examined in Section 17.3. Section 17.5 discusses the characteristics of equity markets in Europe and elsewhere, including data on capitalization and turnover. It continues the discussion about trading structures that we began in Chapter 16 and includes a section on interpreting and analysing the equity market data in the *Financial Times*. Section 17.6 summarizes.

## 17.2 Company shares: types, characteristics and returns

A joint stock firm, often referred to rather loosely as a ‘corporation’, is one that can raise capital by the issue of bonds and shares to the general public. At the time of its incorporation, such a firm must specify the quantity (and type) of shares that it proposes to issue. In the UK, these specifications are contained in a firm’s **memorandum** and **articles of association**.

These documents will specify, for example, the total of **authorized shares**. Authorized shares may be *issued*, that is, they have been sold to shareholders, or they may be authorized but as yet *unissued*. The two main classes of shares are **equity** (or **ordinary**) **shares** and **preferred shares**. In the USA, equities are more frequently referred to as **common stock**. The holders of ordinary shares are legally the owners of the firm. This means that they have voting privileges which allow them to appoint and dismiss members of the board of directors; in most countries company legislation also specifies those decisions about which directors have to consult shareholders and obtain their permission. Because they are the owners of the firm, ordinary shareholders receive a share in the profits of a firm after all prior claims have been met. The prior claims include payments to creditors, including interest to bondholders, and all taxes. With the shareholders’ permission, the directors will also retain a proportion of profits (the **retention ratio**)<sup>2</sup> in order to finance new investment projects. The shareholder’s share of profit is paid in the form of a **dividend** per share. We can now readily see why equities are generally thought to be riskier assets than bonds. With straight bonds, at least, the income (coupon) stream is fixed. With ordinary shares the dividend per share may vary for one or more of several reasons: the trading success of the firm may rise or fall; interest rate or tax changes may take a larger or smaller slice of profits; changes in the retention ratio will cause dividends to rise or fall, even when post-interest, post-tax profit is unchanged. When issued, ordinary shares have a *par* value, though this is of little interest unless the firm becomes insolvent. The issue price is usually well above the par value and, once issued, it is the market price in which investors are interested.

In addition to receiving a dividend, ordinary shareholders would normally expect to benefit over time from an increase in the capital value of their shares. Each share represents a claim on the *nominal* profits of the firm. These, and thus dividends, will rise over time and if the share price were to remain constant the yield would rise continuously towards infinity. Since the return on shares must bear some relationship to the returns on other assets, it follows that share prices must rise over time if the yield is to remain stable.

<sup>2</sup> We shall later refer to the *payout ratio*. The payout ratio is 1 *minus* the retention ratio.

*Preferred shares* pay a fixed dividend (and in that sense are like a bond). Preferred shareholders rank behind bondholders, however. Thus, in periods of low earnings bondholders may be paid when preferred shareholders (and ordinary shareholders also of course) get nothing. Furthermore, unlike bondholders, preferred shareholders have no power to declare the firm insolvent. Predictably, there are many variations on the preference theme. With *cumulative preferred shares*, unpaid dividends are cumulated and become payable when earnings permit. *Convertible preferred shares* carry rights to convert to ordinary shares on specified terms and at specified times. And there are other variations.

The fact that the income stream from ordinary shares is uncertain naturally makes share valuation more difficult (than, say, bond valuation). The difficulties are further increased because it is difficult to establish precisely the degree of risk for any individual share and thus it is difficult to calculate an appropriate rate of discount.

The dominant approach to valuing company shares is known as **fundamental analysis**. This is the approach that we took in Section 11.4. An alternative, which attracts occasional attention, is known as **technical analysis**. In the next section, 17.3, we shall look in some detail at the pricing or valuation of ordinary company shares, concentrating mainly on the former methods, though saying a little also about the latter. Because the behaviour of share prices is subject to so many, and often unpredictable, influences, we devote Section 17.4 to what causes changes in share prices, rather than summarizing the relevant variables in two boxes as we did for bonds.

## 17.3 Equity pricing

### 17.3.1 Dividend models

In Chapter 11 we had an introduction to equity pricing which consisted of discounting a share's dividend payments. This approach gives rise to a series of what are called **dividend models** of share valuation and it grows out of the conventional approach to asset valuation with which we are now familiar. This approach says that the present value of an asset consists of the sum of its future earnings, each discounted at an appropriate rate which recognizes the time we have

to wait and the risk or uncertainty attaching to the earnings.

Recall from above that company shares have no redemption date or redemption value. In that sense, equities are like perpetual or irredeemable bonds. If we assume that dividend payments go on forever at a constant level, then:

$$PV = \frac{D_1}{(1+K)} + \frac{D_2}{(1+K)^2} + \frac{D_3}{(1+K)^3} + \dots \quad (17.1)$$

or, more compactly:

$$PV = \sum_{t=1}^{\infty} \frac{D_t}{(1+K)^t} \quad (17.2)$$

where  $D$  stands for the dividend payment and  $K$  for the discount rate. If  $D$  is given and the payments go on forever, Equation 17.2 simplifies to:

$$PV = \frac{D}{K} \quad (17.3)$$

which is the same formula that we used for valuing a perpetual bond in Section 11.3.2, except that  $D$ , the dividend, replaces  $C$ , the coupon, and  $K$  replaces  $i$ , the rate of interest.

In the last chapter we discounted the coupons of perpetual bonds by the current long-term interest rate and by simple rearrangement of terms we could show that the long-term interest rate by which we were discounting was also the rate of return that perpetual bondholders would receive if they bought bonds at a price which was equal to the present value arrived at as a result of that discounting. Doing the same here gives us:

$$K = \frac{D}{P} \quad (17.4)$$

The discount rate thus *is* the rate of return. Furthermore, *in equilibrium*, it must be the case that the rate of return that investors receive must be the *required* rate of return. (If you are doubtful, ask yourself 'why should investors accept anything else?' If the actual return is not equal to the required rate, investors are free to sell (or buy), causing prices and yields to change until they get the return they require). So now we may say that, in equilibrium, the rate at which future earnings are discounted is the investors' required rate of return.

There is one further equivalence which we need to note. In Equation 17.4,  $K$  is also the cost of capital for

a firm which is financed solely by the issue of shares with a constant dividend payment.  $K$  is the return that investors require and this is the return that they actually receive because the firm pays the current level of dividend. If it wishes to raise new capital by issuing new shares at this price, then the firm must accept the future commitment to pay this level of dividends. Imagine for a moment that the firm cut its dividend, trying to reduce the cost of its new capital. If  $\bar{K}$  is the *required* rate of return, investors will accept the new issue of shares only when the price falls to a level that preserves the value of  $\bar{K}$ . Let us repeat: if  $\bar{K}$  is the rate of return required by investors, then this is the cost that the firm has to pay for new capital.

As we have seen, the required rate of return for equities is represented by  $\bar{K}$  and this is the same  $\bar{K}$  which we saw derived, in Chapter 8, with the help of the capital pricing model. For an asset,  $A$ , recall:

$$\bar{K}_A = K_{rf} + \beta_A(K_m - K_{rf})$$

where  $K_{rf}$  is the risk-free rate of interest,  $K_m - K_{rf}$  is the whole market risk premium and  $\beta_A$  is an index of the riskiness of asset  $A$  when compared with the market as a whole. Thus, in Equation 17.3, we discount the perpetual, and constant, dividend stream by a rate,  $\bar{K}$ , which takes into account the current level of risk-free rates, the market's pricing of average or benchmark risk as represented by the whole market portfolio, and the riskiness of the asset itself.

However, while equities may be like perpetual bonds in having no redemption date or value, the assumption of constant dividend payments is clearly quite unrealistic. We noted above that equities are riskier than bonds precisely because their dividend payments can fluctuate for a variety of reasons. Furthermore, with the passage of time one would expect dividends on average to grow. This is because new investment enlarges the firm's productive capital, leading to larger output, and also because dividends are paid out of money profits and inflation will cause money values to increase, even when there is no change in volume. We could make the model rather more realistic, therefore, by allowing dividends to grow.

The simplest assumption that we can make about growth is that growth occurs at a constant rate,  $g$ . Thus:

$$PV = \frac{D_1}{(1 + \bar{K})} + \frac{(1 + g)D_1}{(1 + \bar{K})^2} + \frac{(1 + g)^2 D_1}{(1 + \bar{K})^3} + \frac{(1 + g)^3 D_1}{(1 + \bar{K})^4} + \dots \quad (17.5)$$

Simplifying Equation 17.5 by using the formula for the sum of a geometric progression, and assuming that the market prices the share at its present value, then:

$$P_0 = PV = \frac{D_1}{(\bar{K} - g)} \quad (17.6)$$

where  $P_0$  is the current price. Equation 17.6 is known as the **constant growth model**, or **Gordon growth model** after Gordon (1962).

Notice that we can rearrange Equation 17.6 in order to show that the required rate of return,  $\bar{K}$ , is the sum of the dividend yield and the rate of growth of dividends.

$$\bar{K} = \frac{D_1}{P_0} + g \quad (17.7)$$

Notice also that  $g$  is the rate of capital appreciation, so that Equation 17.7 is equivalent to writing the total return on a share as its current yield plus its capital growth. The equivalence between the growth of dividends and the rate of capital appreciation can be seen when we consider that if:

$$P_0 = \frac{D_1}{(\bar{K} - g)} \quad (17.8)$$

#### Exercise 17.1 Share valuation – dividend models

Wyndham Wines plc is a company whose dividends have been growing at a steady 15 per cent for the past few years. Last year it paid a dividend of 30p. Its shares are calculated to have a  $\beta$ -coefficient of 1.4, while the risk-free rate of interest is 6 per cent and the market risk premium is 10 per cent.

Using Equation 17.6, calculate a 'fair price' for Wyndham Wines' shares.

Suppose now that the central bank raises the official interest rates by 1 per cent, the market risk premium and the share's  $\beta$ -coefficient being unchanged. What effect will this have on the price of Wyndham Wines' shares?

Suppose now that in the course of the year Wyndham Wines announces the disposal of a soft-drinks subsidiary in Spain. This part of the business has always had highly variable earnings and analysts calculate that selling it off should reduce Wyndham Wines'  $\beta$ -coefficient to 1.3. Calculate a new fair price.

Answers are in Box 17.1.

**Box 17.1 Some solutions**

The fair price is given by Equation 17.6:

$$P_0 = D_1 / (K - g)$$

If we take the data given in Exercise 17.1 for purposes of illustration, we can calculate an initial fair price of Wyndham Wines' shares as follows:

$$\begin{aligned} D_1 &= D_0 (1 + g) = 30p (1 + 0.15) = 34.5p \\ \bar{K} &= K_{rf} + \beta(K_m - K_{rf}) = 6\% + 1.4(10\%) = 20\% \\ g &= 15\% \end{aligned}$$

Thus:

$$P_0 = 34.5 / (0.2 - 0.15) = 690p \text{ or } \pounds 6.90$$

If the central bank raises official interest rates from 6 per cent to 7 per cent and all else is unchanged, then we have to recalculate  $\bar{K}$ .

$$\bar{K} = 7\% + 1.4(10\%) = 21\%$$

Substituting 21 per cent in the denominator,

$$P_0 = 34.5 / (0.21 - 0.15) = 575p \text{ or } \pounds 5.75$$

If Wyndham Wines reduces its  $\beta$ -coefficient by disposing of a problem subsidiary, then, with all else unchanged,  $\bar{K} = 7\% + 1.3(10\%) = 20\%$ . Thus:

$$P_0 = 34.5 / (0.2 - 0.15) = 690p \text{ or } \pounds 6.90$$

The price returns to its original level.

then the price in the next period must be:

$$P_1 = \frac{D_2}{(\bar{K} - g)} \text{ where } D_2 = D_1 (1 + g) \quad (17.9)$$

Thus:

$$P_1 = \frac{D_1}{(\bar{K} - g)} (1 + g) \quad (17.10)$$

Substituting Equation 17.8 into Equation 17.10:

$$P_1 = P_0(1 + g) \quad (17.11)$$

The change in price between one period and the next takes place at the rate  $(1 + g)$ . That  $g$  is the percentage capital gain is then easily shown by rearranging Equation 17.11:

$$P_1 = P_0 + gP_0 \quad (17.12)$$

and thus:

$$g = \frac{P_1 - P_0}{P_0} \quad (17.13)$$

In Equation 17.6,  $\bar{K}$  must be greater than  $g$  in order to yield a finite result. In practice, this condition is likely to hold if we remember that  $\bar{K}$  is the cost of capital to firms. Imagine for a moment that the situation were reversed, that is,  $g > \bar{K}$ . The growth rate would exceed the cost of capital. This would be extraordinarily fortunate for any firm and the firm would expand as rapidly as it could. Its demand for capital would push up  $\bar{K}$  and this would be further reinforced as other firms were attracted into the market. As a result of this expansion, demand would eventually be satisfied and  $g$  would fall. The rise in  $\bar{K}$  and the fall in  $g$  would eventually reverse the inequality.  $\bar{K} < g$  is not a sustainable condition.

Consider now the origins of  $g$ . Assume, for a moment, constant prices. The growth of the firm's earnings depends upon how much it adds to its capital stock, that is, its net investment, and the productivity of that additional investment. Let  $E_t$  stand for the firm's earnings,  $v_t$  for net investment and  $\phi$  for the payout ratio – the fraction of earnings paid out as dividends. (All variables are in per-share form.) Then:

$$v_t = (1 - \phi)E_t \quad (17.14)$$

Assume that the investment generates a return of  $\omega$  per year, then earnings will increase by  $\omega v_t$  per year. Thus:

$$E_{t+1} = E_t + \omega v_t = E_t[1 + \omega(1 - \phi)] \quad (17.15)$$

And since:

$$E_t[1 + \omega(1 - \phi)] = E_t(1 + g) \quad (17.16)$$

by definition, then

$$g = \omega(1 - \phi) \quad (17.17)$$

**Exercise 17.2 Share prices and yields**

In Exercise 17.1 we saw that the required rate of return on Wyndham Wines plc's shares was 20 per cent p.a.

- 1 Using the information given in Exercise 17.1, identify separately the dividend yield component and the capital gain component.
- 2 Suppose that there is a reduction in the market price of risk so that the market risk premium falls to 9 per cent, risk-free rates remaining at 6 per cent and the  $\beta$ -coefficient remaining at 1.4. What happens to (a) the total return on Wyndham Wines' shares and (b) the dividend yield?

If we now substitute Equation 17.17 into Equation 17.6 we are on the verge of some interesting discoveries.

$$P_0 = \frac{D_1}{\bar{K} - \omega(1 - \phi)} \quad (17.18)$$

Remember that  $\phi$  is the payout ratio (or 1 *minus* the retention ratio), the fraction of earnings paid out as a dividend. We can now rewrite the numerator of (17.6):

$$P_0 = \frac{\phi E_1}{\bar{K} - \omega(1 - \phi)} \quad (17.19)$$

Notice that changing the payout ratio changes both the numerator and the denominator, and *in the same direction*. A reduction in the payout ratio reduces the dividend payment, but it also increases the growth rate. This is what, intuitively, one would expect. If the firm pays out less as dividends, retaining more of its

earnings in order to invest more, one might expect that shareholders will lose dividend income but one might also expect some compensation in the form of faster capital gain. Indeed, we can show that if a firm is in the long-run equilibrium position where the return on new capital investment is just equal to its cost of capital that is,  $\bar{K} = g$ , and we also assume:

- taxation which does not discriminate between capital gains and income
- zero transactions costs in buying and selling equities

then the compensation when the payout ratio changes is complete. The reduction (for example) in dividend yield will be just matched by the increase in capital gain, leaving the cost of capital and the return to shareholders unchanged. This is known as the Miller–Modigliani (1961) **dividend irrelevance hypothesis**. Box 17.2 provides a numerical illustration.

### Box 17.2 Dividend payouts and the value of shares

If we assume that a firm uses all retained earnings to finance new investment and that there is no other source of investment funds, then Equations 17.6 and 17.19 are equivalent. Imagine now a firm whose earnings or profits are the equivalent of 50p per share and it has a policy of paying out half of its earnings as dividends, retaining the rest for investment projects which produce a real return of 20 per cent p.a. In equilibrium, the return on capital projects will equal the required rate of return and so this too is 20 per cent p.a. Assume, finally, that its earnings growth rate has been steady at 10 per cent p.a. for the last few years. Then, from Equation 17.19 we can see that:

$$\begin{aligned} P_0 &= 0.5(50\text{p}) / [0.2 - 0.2(1 - 0.5)] \\ &= 25\text{p} / [0.2 - 0.1] \\ &= 25\text{p} / 0.1 = 250\text{p} = \text{£}2.50 \end{aligned}$$

Suppose now that the firm takes the decision to invest more of its earnings and raises the retention ratio to 60 per cent. If all else is unchanged, then:

$$\begin{aligned} P_0 &= 0.4(50\text{p}) / [0.2 - 0.2(1 - 0.4)] \\ &= 20\text{p} / [0.2 - 0.12] \\ &= 20\text{p} / 0.08 = 250\text{p} = \text{£}2.50 \end{aligned}$$

In these circumstances, the dividend policy pursued by the firm has no effect upon the value of its shares (and no effect upon the cost of capital, which remains at 20 per cent). But remember the assumptions that we made:

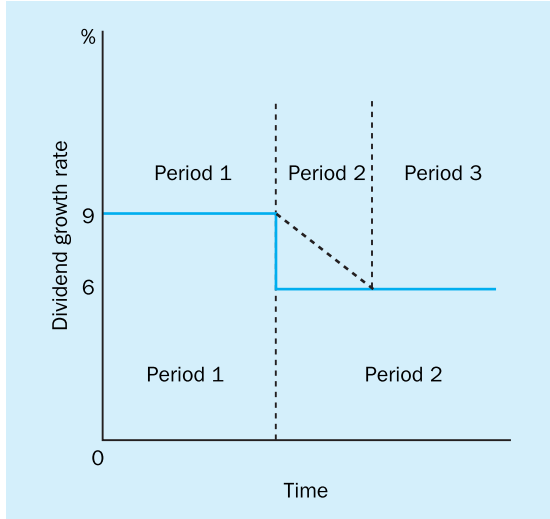
- The cost of capital must be just equal to the return on capital.
- Income and capital gains must be treated equally by the tax system.
- There must be no transaction costs in the buying and selling of shares.

The last two conditions are important to shareholders. If, for example, capital gains are taxed at a lower rate than income, then shareholders will prefer a lower payout ratio in order to earn more of their return through capital gain. Furthermore, because they keep more of their 20 per cent return after tax, they will be willing to accept a pre-tax rate of return of less than 20 per cent and the cost of capital to the firm will consequently be lower.

As another example, retired shareholders may prefer income to capital gain and thus would demand a higher return (impose a higher cost of capital) if a firm operated a low payout ratio. But if there are no transactions costs, they should have no objection to low payouts and large capital gains because they will be able to create an income by selling some shares every so often, without diminishing the value of their shareholding. This is one of several practices available to shareholders which have become known as the ‘home-made alternative’.

Thus the assumptions are important. Dividend policy will *not* be irrelevant if they do not hold.





**Figure 17.1** Dividend growth in 2- and 3-period models

Because the Gordon model assumes a constant rate of growth of dividends throughout the whole period of the company’s life, it is often referred to as a **one-period model**. Clearly, the assumption that firms grow at a constant rate throughout their life is unrealistic. More typically, we might expect that a firm would grow at a rapid rate in the early years (this could be the period when  $g$  is temporarily greater than  $\bar{K}$ ). During this first period, earnings growth may still be constant, but at a high rate. After this initial period, earnings grow more slowly. In this second period, earnings growth may well be constant again, but at a lower rate. In practice, many analysts would take this long-run steady-state growth rate to be equal to the growth rate of nominal *GDP*, since the growth rate of the economy as a whole consists of nothing more than the sum of the growth rates of its productive units. A simple **two-period model** can therefore be constructed in which the current price is calculated by discounting a series of earnings expected to grow at a constant rate,  $g_1$ , for a period of  $N$  years, and then at a new constant rate of  $g_2$  indefinitely after  $N$ .<sup>3</sup>

In the simplest two-period model, the transition from an unusual to a permanent growth rate is assumed to occur instantly, in one sudden step. This too is rather unrealistic. It is more probable that the

end of a high growth period (for example) is indicated by a decline in the growth rate *over a period*, until it settles at the permanent level. This gives rise to a **three-period model**, in which there is a high growth phase, a transition phase and a permanent growth phase. Figure 17.1 shows the behaviour of earnings growth in a simple two-period model (the solid line) and compares it with the behaviour of earnings growth in a three-period model (the dashed line).<sup>4</sup>

### 17.3.2 Price earnings ratios

In the last section we defined  $\phi$ , the payout ratio, as 1 *minus* the retention ratio. If we let  $\lambda$  be the retention ratio, then we can rewrite Equation 17.17 as:

$$g = \omega\lambda \tag{17.20}$$

Substituting into Equation 17.7 gives:

$$\bar{K} = \frac{D_1}{P_0} + \omega\lambda \tag{17.21}$$

Recall, from the last section, that  $\omega$ , the return on the firm’s investment projects, could be less than, equal to, or greater than its cost of capital. Thus  $\omega = a\bar{K}$ , where  $a < 1$ , 1 or  $> 1$ . As we also said in the last section, we might normally expect firms to invest in all those projects up to the point where the productivity of capital just matches the cost of capital (that is,  $a = 1$ ). Recall furthermore that dividends are equal to the fraction of earnings paid out ( $D_0 = \phi E_0$ ) or  $(1 - \lambda)E_0$ . This being so, then:

$$\bar{K} = \frac{(1 - \lambda)(1 + \omega\lambda)E_0}{P} + \bar{K}\lambda \tag{17.22}$$

Assume for the moment that a firm is investing in all projects in which the project returns just match the cost of capital as dictated by the return required by shareholders, i.e.:

$$\omega = \bar{K} \tag{17.23}$$

Then substituting Equation 17.23 into 17.22 and rearranging yields:

$$\bar{K}(1 - \lambda) = \frac{(1 - \lambda)(1 + \omega\lambda)E_0}{P} \tag{17.24}$$

<sup>3</sup> See Elton and Gruber (1995) Ch. 18 for details.

<sup>4</sup> The mathematics are explained in Elton and Gruber (1995) Ch. 18.

and

$$\bar{K} = \frac{(1 + \omega\lambda)E_0}{P} = \frac{E_1}{P} \quad (17.25)$$

What we can now see is that in these (rather special) circumstances:

$$\bar{K} = \frac{D_1}{P} + g = \frac{E_1}{P} \quad (17.26)$$

That is to say, the required rate of return will be equal to the dividend yield plus capital appreciation and this in turn will be equal to total earnings divided by the share price. What is special about the circumstances? The answer is that in Equation 17.23 we made  $\omega$ , the firm's return on its real capital projects just equal to the cost of capital, i.e. to the required rate of return,  $\bar{K}$ . Look at what happens in Equation 17.25 if we allow  $\omega$  to vary. Increasing the value of  $\omega$  increases the value of  $E_1/P$  (and vice versa) so that it is no longer equal to  $\bar{K}$ . Any firm which has a return on its real capital equipment which exceeds its cost of capital ( $\omega > \bar{K}$ ) will have a ratio of  $E_1/P$  which exceeds the rate of return required by shareholders. This is not a long-run equilibrium position. Any firm in this situation is

receiving a signal that it can increase profits by raising additional funds from shareholders at the rate  $\bar{K}$  and investing them in projects which yield the rate  $\omega$ . Any firm in these circumstances is a growth firm.

Now look at the situation from the shareholders' point of view. We have just seen that any firm which has a return on its real capital equipment which exceeds its cost of capital ( $\omega > \bar{K}$ ) will have a ratio of  $E_1/P$  which exceeds the rate of return required by shareholders. Provided that  $E_1/P$  exceeds  $\bar{K}$ , the shares offer the prospect of excess returns. Every shareholder will want to buy them. The effect will be to push up the price, and to reduce the ratio  $E_1/P$ . Thus, we would expect a firm with good growth prospects to have a lower  $E_1/P$  ratio than a firm with a slow growth outlook.

In the UK, it is more usual to talk about the inverse of the ratio  $E_1/P$ , and to refer to it as the **price/earnings** or **P/E ratio**. Everything said about the  $E/P$  ratio still applies of course – but in reverse. A firm whose real projects offer an actual return which exceeds the required return will find that its  $P/E$  ratio is bid *up* until a new equilibrium between the *actual* and *required* rates is re-established. Box 17.3 provides an illustration of the process.

### Box 17.3 High growth means high P/E

Sarum Sausages plc has earnings per share this year of 46.51p. Until now, it has enjoyed earnings growth of 7.5 per cent p.a. and on this basis expects to have earnings per share of 50p next year. It regularly retains one-half of its earnings for investment in new plant and equipment, which earns a return which just meets the cost of capital. It is financed entirely by the issue of ordinary shares and its cost of capital is 15 per cent p.a. Using Equation 17.6, we can calculate the share price based on this information.

$$P_0 = \frac{25p}{(0.15 - 0.075)} = \frac{25p}{0.075} = 333p$$

However, this year it plans to introduce a new product – wild boar sausages – and calculates that this will raise the overall return on its capital equipment to 20 per cent p.a.

The first question we might ask is what will happen to the actual return on Sarum's shares, if everything else, including their price, remains as it is.

$$P_0 = \frac{25.58p}{(0.15 - 0.10)} = \frac{25.58p}{0.05} = 511.6p$$

Using Equation 17.7, we can show that at their current price (£3.33) Sarum's shares would yield a return well in excess of that currently required by shareholders once it invests in the new line since earnings (and dividends) would be growing at 10 per cent p.a.

$$K = \frac{25.58p}{333} + 0.1 = 0.177 \text{ or } 17.7\%$$

At the current price and the rate of growth promised by the new investment the *actual* return to shareholders would be 17.7 per cent against the *required* rate of 15 per cent. We know that this means the shares will be highly desirable and that additional demand for the shares will push up the price until it reaches £5.12, at which level the *actual* return on the shares will match the *required* return of 15 per cent.

Now look at the  $P/E$  ratio in the normal growth phase and the fast growth phase. In the earlier situation the  $P/E$  ratio was  $333/50 = 6.66$ . When it became apparent that Sarum Sausages faced a particularly rapid period of earnings, however, the ratio jumped to  $511.6/51.16 = 10$ .

It is a short and simple step now to see how the information contained with a firm's  $P/E$  ratio can be combined with knowledge of the required rate of return to evaluate the price of a share for a company with *any* type of growth prospects, with a view to buy/sell recommendations. We have merely to find the value for  $P$  which makes the ratio  $E_1/P$  (the inverse of the  $P/E$  ratio) equal to the required return (in Equation 17.26). This is illustrated in Box 17.4.

As a means of evaluating the price of a share, however, one might raise two questions about the use of  $P/E$  ratios in this way. Firstly, one might ask, how is it *fundamentally* different from the dividend discount model? We are still, as in the dividend discount model, checking the market price to see whether or not it provides the required rate of return where the required rate of return is still being established by reference to the capital asset pricing model. Furthermore, one might ask, if it is not fundamentally different, does it perhaps have some advantage in convenience? The answer to that is 'not obviously'. In the dividend discount model, we discounted the dividends actually declared by the firm, after allowing for their rate of growth. In Box 17.5, we substituted earnings for dividends but then we needed to know the retention ratio and the rate of return on the firm's investment projects relative to its cost of capital. There is no obvious economy of information or ease of calculation in doing that.<sup>5</sup>

When it comes to the use of  $P/E$  ratios in practice, therefore, we should not be surprised if their application is rather different from our illustration above. When we first met the practice of asset valuation (in Section 11.3) we noted that analysts are often interested in *relative* valuation. That is to say they are more concerned with the question of whether an asset yields a return which is greater than other assets with similar characteristics (or, equivalently, of whether its price is lower). It is for purposes of relative valuation that the  $P/E$  ratio is more commonly used. We look now at how that is done.

The price/earnings ratio tells us the price that an investor has to pay in order to buy a claim on a flow of earnings (which might be paid out as dividends or retained for re-investment and capital growth).

#### Box 17.4 Share pricing by $P/E$ ratio

Consider again the situation facing Sarum Sausages in Box 17.3. From Equation 17.20 we know that its new investment should cause earnings growth over the year of  $\omega\lambda$ , the return on its investment multiplied by the retention ratio. The growth rate in this case, therefore, is  $0.2 \times 0.5 = 0.1$  or 10 per cent. In the next period, therefore, Sarum's earnings should be 51.16p per share.

Using Equation 17.6 again we can calculate the equilibrium price in the next time period assuming that shareholders still impose a cost of capital of 15 per cent.

$$P = \frac{(1 - 0.5)51.16}{0.15 - 0.1} = \frac{25.58}{0.05} = 511.6p$$

At a price below £5.12, shares in Sarum Sausages plc are cheap and would be an obvious 'buy' recommendation. At any price above £5.12 the shares would be expensive and investors would be recommended to sell before the market re-prices them correctly.

Other things being equal, an investor would prefer to pay the lowest price per pound of earnings. Thus, a firm with a  $P/E$  ratio below the norm for the sector in which it operates might be considered 'cheap'. Notice, however, that this is only an indication that the share is *relatively* cheap. There is nothing in *this* use of  $P/E$  ratios to justify the *absolute* level of prices of shares in this sector. Notice also that the share will be relatively cheap if we have indeed compared it with other shares where 'other things are *genuinely* equal'. A low  $P/E$  ratio may not indicate underpricing; it may simply indicate that something about the firm gives its earnings a higher degree of risk and makes it less attractive relative to its earnings. Conversely, a firm with a high  $P/E$  ratio may not be overpriced. It may be that there are characteristics of the firm that suggest that it has very good growth prospects. Its currently high price, relative to earnings, means that shareholders receive a low dividend yield ( $D_1/P_0$ ) but this is compensated by a

<sup>5</sup> Furthermore, there are considerable drawbacks to working with earnings since a firm's published earnings can vary considerably according to the accounting methods being used. This is not an issue we can pursue here but it is widely discussed in textbooks of corporate finance. There is a very good illustration of the problem in Blake (2000).

**Box 17.5 Financial Times share price data**

The table to the right shows the information published by the *Financial Times* on 20 May 2004, about shares in the 'Beverages' sector. The name of the company is followed by one or more symbols whose meaning has to be checked in the notes to the whole table. They mainly indicate further information which is available.

The table next shows the price at the close of trading on 19 May and the change in the price between the beginning and end of trading. Most prices are quoted in pence; those which are quoted in pounds would be shown '£'. The next two columns show the highest and lowest price reached in the course of the last 52 weeks. This provides some context in which to view the current price. 'Yield' is short for 'dividend yield' and shows the pre-tax dividend per share divided by the share price. The next column gives the price/earnings ratio. The final 'volume' column shows the number of shares traded on 19 May.

## BEVERAGES

	Notes	Price	+ or -	52 week high	low	Yield	P/E	Volume 000s
<b>AldDomq</b> . . . ♣†		447 <sup>1</sup> / <sub>4</sub>	-3 <sup>1</sup> / <sub>2</sub>	474 <sup>1</sup> / <sub>2</sub>	326	3.3	13.8	10,249
Barr(AG) . . . . .		727 <sup>1</sup> / <sub>2</sub> xd	-1 <sup>1</sup> / <sub>2</sub>	742 <sup>1</sup> / <sub>2</sub>	505	3.5	14.1	9
<b>Diageo</b> . . . ♣†		726	-11	780	612	3.6	15.8	40,295
GlenmrgA . . . . .		905	...	915	775	2.1	19.1	6
B . . . . . ♣†		1450	...	1450	940	0.7	30.7	-
Kirin Y . . . . .		527 <sup>1</sup> / <sub>2</sub>	+16 <sup>1</sup> / <sub>2</sub>	589	391 <sup>3</sup> / <sub>4</sub>	1.1	31.7	2,994
Merrydwn . . . . .		94	...	107	53	1.1	17.4	21
Nichols . . . . . ♣		126	+6 <sup>1</sup> / <sub>2</sub>	147	108 <sup>1</sup> / <sub>2</sub>	7.0	26.4	107
<b>SABMiller</b> . . . ♣†		621	+22	640 <sup>1</sup> / <sub>2</sub>	395 <sup>1</sup> / <sub>2</sub>	2.6	18.5	12,912
<b>Scot&amp;New</b> . . ♣†		416 <sup>1</sup> / <sub>2</sub>	-1	436 <sup>1</sup> / <sub>2</sub>	335 <sup>3</sup> / <sub>4</sub>	4.8	13.5	3,300

Source: *Financial Times*, 20 May 2004.

high capital growth rate,  $g$ . We must be careful to compare like with like.

Because analysts commonly use  $P/E$  ratios in their assessment of share value, the  $P/E$  ratio is one of the essential pieces of information that the *Financial Times* publishes daily. Box 17.5 shows an extract from the information published by the *FT* on 20 May 2004.

As Box 17.5 shows,  $P/E$  ratios can vary quite substantially, even within one sector, but it is important to remember only to compare  $P/E$  ratios for companies which are strictly comparable. (There is further discussion of the data in Box 17.5 in Section 17.5 below.)

Used in this way, to try to identify anomalies in relative pricing, we can now see that there are major differences between the dividend discounting approach to share valuation and the  $P/E$  approach. Firstly, as we said above, comparing  $P/E$  ratios is an exercise in *relative* evaluation. We cannot ever say that a share is 'fairly priced'. Judged by absolute standards, having regard to risk and the market price of risk, for example, a whole sector of shares may be grossly overvalued, but we still have to say about a company whose  $P/E$  ratio lies below the sector norm for no apparent reason that it is *undervalued*. The reason for this lies in the second contrast between the two methods. Used in the way we have just described,  $P/E$  ratios tell us

nothing explicit about the quantity of risk or about the price of risk. All the influences on a share's price, except earnings themselves, are bundled up in a collective way in the ratio. Finally, it is worth noting that, in order to be useful, the  $P/E$  ratio approach has to assume that equity markets are to some degree inefficient, at least for short periods. That is to say that the approach relies upon being able to find shares which are mispriced relative to others. There is simply no point in examining  $P/E$  ratios if we begin from the assumption that the market is so efficient that share prices are always 'correct' share prices.

### 17.3.3 Asset values

It is not uncommon, when reading commentaries on share prices, to meet the statement that 'the current share price is at a premium (or discount) to the firm's asset value'. What the former means is that the present price of the share gives the firm a value which is greater than one would arrive at by valuing its component assets individually and then summing the component values. The implication of the statement, of course, is that the share price is 'too high', should be lower, will probably fall shortly when the market recognizes the anomaly, and should be sold (or at least not bought). Notice immediately that this is

again a statement about *relative* value, though this time the comparison is with the underlying assets of the same firm rather than with another firm. As it stands, it says nothing about the underlying assets being correctly valued in any absolute sense. One could defend asset valuation as a source of absolute values, *if* one could argue that the underlying asset values were absolutely correct. If that were so, then a statement that the share price (for example) is at a premium to asset value tells us *both* that it is too high relative to asset values but also that it is absolutely too high, since the underlying assets are correctly valued in an absolute sense. The question this poses, however, is how do we arrive at an absolute valuation for the underlying assets? The answer to that is that we can only get it by the standard practice of discounting the future earnings of those assets by some appropriate, risk-adjusted, discount rate. And if we do that, then we are essentially back to a discounted dividend model of valuation. Thus, if asset valuation is to mean anything strictly different from the approach we outlined in Section 17.2.1, then we have to treat it as another approach to relative valuation which might be useful in certain circumstances.

Why might one want to use it? One clue is given to us when we examine why the value of the firm, represented by its share price, might differ from the value of its component assets. This often happens because the component assets are valued on the basis of the going market price for similar assets. Thus, one might consider what price could be got for the firm's premises, sold simply as commercial premises. To this one would add the market price of any equipment, sold separately from the site. In addition, there would be market prices for its vehicles, office furniture, stocks of raw materials, finished goods and so on. It is not difficult now to see why share value and asset value (defined in this way) might differ. It is usually the case that the assets, when sold off separately, have to compete with a large number of very similar second-hand assets. However, when combined together in the hands of a skilled management which is able to produce a unique good or service for which there is high demand, the value of the assets when *constituting the firm* could be considerably higher. This is another way of saying that the valuation of the component assets is incomplete. There is something else which adds value when they are combined as this particular firm. The obvious omission is the management or 'human capital' and the reason that it is left out of the

valuation is that there is no recognized market for human capital (since the abolition of slavery). The problem is recognized as particularly acute in certain industries. Firms specializing in marketing and other media-related activity provide frequent examples. Their tangible, marketable assets often consist of little more than premises, office furniture and the usual computing and communications equipment. None of this is highly specialized and once placed on the market it competes with a large volume of similar equipment. The bulk of the 'value' of such firms lies in the management and employees. It is their creative skill that enables the firm to generate large earnings relative to its asset value.

On the face of it, therefore, asset valuation does not look generally very useful as a means of determining a share's (and firm's) value. However, we can say that evaluating a share's price by looking at the value of the underlying assets is particularly useful whenever the question of selling the underlying assets arises. Such a situation is almost invariably associated with mergers and takeovers for two reasons.

Firstly, the share price relative to asset value may enable us to identify 'bargains'. If, for example, a firm's share price values it at a discount to its assets, this is saying that the firm can be bought at a price which is less than that which could be realized by selling its assets on the secondhand market. This makes the firm an obvious target for takeover, since the bidding (or predator) firm knows that once it has possession it faces a choice of profitable strategies. It might decide to keep the target firm in operation, using its own management to improve its performance. If this looks unattractive, it can simply close the firm and sell the assets for a higher price than the price it paid.

Secondly, the takeover of a thriving firm may be encouraged if the predator firm thinks that it can sell part of the target business for a profit. In this case, selling some of the target firm's assets is being used to finance the takeover. Doing this successfully depends upon being able to identify some assets in the target firm which are contributing less than their market value to the price of the share. This seems to be possible where the target firm is large and consists of several quite distinct operations. In this situation, the firm's accounts will often make it possible to identify the contribution to total earnings (or dividends) that each division makes. This enables analysts (and predators!) to say whether the earnings of the assets in their present use gives them a value which is greater or less

than their value on the open market. In the late 1980s there were a number of takeovers which resulted in the subsequent sale of some or all of the assets taken over. The practice was common enough to acquire its own name, 'asset stripping'.

Where the price of a share values the firm at a discount to its asset value, this is a signal to buy since the undervaluation is not likely to persist for the reasons we have just seen.<sup>6</sup>

### 17.3.4 Technical analysis

An entirely different approach to the valuation of equities is known as **technical analysis**, or *chartism* to give its popular name. The core of technical analysis uses visual representations of past price movements to identify patterns which, it is believed, repeat themselves. Typically, the past price movement of a security will be plotted using a line or point and figure chart. The analyst then focuses upon the most recent price movement in order to identify a pattern. These patterns go under a variety of colourful names, such as 'head and shoulders', 'wedges', 'flags' and so on. Once such a pattern has been identified, the behaviour of the share in the more distant past can be searched for signs of a similar pattern and, most importantly, the behaviour of the price at the end of that pattern. Sometimes, there will be no comparable pattern in the share's history. Then the analyst will look for the same pattern in similar shares in order to see what happened next in their case. (See also Box 18.4.)

Clearly, we have come a long way from explaining a share's price by reference to its fundamentals. Nothing explains the price in technical analysis except the past movement in the share's price. This is interesting, and makes technical analysis highly controversial in the eyes of many. This is because technical analysis conflicts with the efficient markets hypothesis (which we discuss in Chapter 26). The weakest form of the EMH suggests that all the information that can be obtained from *past* movements in a share's price is already incorporated in the share's *current* price. Thus, if a 'head and shoulders' pattern means that the price is pausing before a major fall, and it is known

#### More from the web Technical analysis

There are thousands of internet sites offering information about 'finance' and 'financial markets'. Most of these are aimed at the private investor and are frankly designed to persuade people to get involved in the stock market, often using, and paying for, some service offered by the website.

Amongst the more educational, however, are three which provide a serious discussion of technical analysis. These are:

[www.equis.com/education/taaz](http://www.equis.com/education/taaz)

In May 2004 this site was providing free online access to the book by Stephen B Achelis, *Technical Analysis*.

[www.investopedia.com](http://www.investopedia.com)

The explanation of technical analysis is just one entry in its dictionary of 4,500 terms. Its examples and illustrations are usually taken from the US. A similar service, with a UK focus, is provided by:

[www.moneyextra.com](http://www.moneyextra.com)

that this is what a head and shoulders pattern means, then shareholders will sell instantly and the price will fall so quickly that no one can take advantage of the information. According to the weak form EMH, the only thing that can change a share's price is 'news' and news, by definition, is unpredictable. If this is the case, then the ability of technical analysts to predict price movements successfully must be the result of luck. It will not be sustained; their predictions will eventually go through a correspondingly bad patch and *in the long run* technical analysis will not enable analysts to earn above average returns.

Nonetheless, technical analysis remains very popular. It also contributes to the liquidity of the market since it increases the diversity of views about a share's price. If technical analysis leads some investors to have views about a share's next movement that differ from those of other investors, this simply helps to ensure that there will always be some people willing to buy when others are willing to sell.

<sup>6</sup> Identifying and recommending shares that value the firm at less than its asset value has often been one strategy followed by newspaper share tipsters.

## 17.4 Share price movements

We begin by distinguishing between the behaviour of share prices in the aggregate (what might be called ‘equity market movements’) and the behaviour of individual share prices. We then distinguish between the short run and the long run.

### 17.4.1 Whole market – short run

As with bonds, in the short run the supply of equities is fixed. In a market diagram, the supply curve is vertical.<sup>7</sup> The demand curve slopes downward, indicating that when prices are lower (and yields higher) *relative to other assets*, there will be a greater willingness to hold equities. With a given stock, changes in prices (and yields) are the result of demand shifts. Prices will change when investors’ perception of the value or fair price of shares in general changes. If something happens to cause investors to put a lower value on shares, for example, the demand curve shifts downward until shares in general seem attractive again at the new price and yield. To explain changes in the *general* level of prices we have to look at general or ‘whole market’ events.

Look again at Equation 17.6. We know that share prices will change if there are changes to  $D_1$ ,  $g$  or  $\bar{K}$ . Investor perceptions of future dividends in general will obviously be responsive to changes in the outlook for the economy as a whole. The movement from boom to recession, for example, or the prospect of a tighter fiscal policy will lead to a ‘downgrading’ of dividend forecasts. A reduction in the numerator, of course, reduces the value of shares. Similar events might also lead to a downward revision of  $g$ , the rate at which future earnings and dividends are expected to grow. Remember also that firms’ payout ratios are irrelevant to shareholders only if the tax system is neutral between income and capital gains and transaction costs are zero. Imagine that a newly elected left-wing government reveals plans for higher tax rates on ‘unearned’ income, perhaps arguing that this will encourage firms to retain earnings (reduce their payout ratios) and increase their investment. As we saw in Box 17.2, shareholders might be quite indifferent to this, if their lower dividends are replaced by larger

capital gains, *provided that they can make a costless sale* of a few shares every time they require income. If they cannot, then this tax change will push share prices down, since shareholders will insist on higher pre-tax yields to compensate for the higher tax on dividends.

For many firms, a fall in the exchange rate will lead to an upward revision of  $g$ , since imports from competitors will be dearer and the firm’s own exports will become cheaper in foreign markets. As a general rule, therefore, a depreciation in the exchange rate helps equity markets, notwithstanding the fact that governments may try to prevent the depreciation, or at least to slow it down, by raising interest rates. An interesting exception to this rule in Europe is the Italian equities market, which almost invariably moves positively with the euro:dollar exchange rate. A depreciation causes share prices to fall because there are relatively few large exporting firms quoted on the Italian exchanges and so the market has only to take account of the implications for inflation and interest rates. Both are likely to increase and this will depress prices, as we see in the next paragraph.

The largest source of market-wide influences, however, is always likely to be found in interest rates or expectations of interest rate movements. Recall that  $\bar{K}$  in Equation 17.6 is the sum of a risk-free rate and a risk premium derived from the market’s current pricing of risk in general ( $K_m - K_{rf}$ ) and the firm’s relative risk characteristics,  $\beta$ . A change in  $\beta$ , of course, reflects a change in the characteristics of the firm itself and is therefore not relevant in this context. However, a change in official interest rates causes a change in  $K_{rf}$  and, other things being equal, must cause a change in  $\bar{K}$ . (Precisely this case is discussed in Case Study number 1.) Notice that a general change in  $\bar{K}$  would follow also if there were a change in the market’s risk aversion. If, for example, investors generally took the view that equities as a class of assets were becoming more risky, then the market risk premium ( $K_m - K_{rf}$ ) would widen, increasing  $\bar{K}$  for all equities and leading to lower prices.

### 17.4.2 Individual shares – short run

Individual shares will, of course, be affected by all those events that affect the prices of shares in general. However, there will in addition be firm-specific events

<sup>7</sup> Readers who want to refresh their memory of this should go back to the discussion surrounding Figure 11.2.

which have their impact on  $D_1$ ,  $g$  and  $\bar{K}$ . The first two may obviously be boosted by news of new product developments or by the granting of new patents giving a firm protection to exploit a particular product for a specified period. Conversely, a firm's share price is likely to react badly when a profitable patent comes to an end or a rival develops a competing or superior product. Through most of 1996, the shares in 'privatized utilities' in the UK were depressed because of plans by the Labour Party to impose a windfall tax if they formed the next government (unrealized in the event). The argument behind the windfall tax was that these ex-nationalized firms had been sold to the private sector at too low a price (at a cost to the general taxpayer in other words) and that since then shareholders had made unreasonable gains. Throughout Europe and the United States, firms are subject to legislation to deter restrictive practices and the development of monopolies which might work against the public interest. News that a firm is to be investigated by the anti-monopoly authorities is often sufficient to cause a fall in its share price – not just because it may have to end some monopoly practice which has been profitable in the past (driving down  $D_1$  and  $g$ ), but simply because the inquiry itself is expected to divert a large amount of management time and effort which would have gone into running the firm into preparing answers to the regulator's questions. Another development that often gives rise to the most spectacular short-term price rises is news of a takeover bid, especially if that takeover bid is resisted. The market regards the bid as evidence either that the bidding firm can operate the assets of the target firm more efficiently (raising future levels of  $D$  and perhaps  $g$  as well) or simply that the target company is underpriced. (This raises serious questions about the efficiency with which the market values firms, an issue we discuss in Chapter 26.) Even if shareholders doubt that the firm will be more profitable in the long run, a contested bid almost invariably results in the bidding firm having to make one or more higher offers. Naturally, if it raises the price at which it is prepared to buy the shares, their price goes up.

It is possible also for firm-specific events to have their impact on  $\bar{K}$ . Recall that the firm-specific component of  $\bar{K}$  is  $\beta$ , an index of the firm's riskiness relative to a whole market portfolio. Many large corporations consist of a widely diversified range of subsidiaries, often the result of past takeovers and mergers. It is not unusual for some subsidiaries to

perform better than others, nor is it unusual for subsidiaries to have different risk characteristics. (These differences were often the reason for combining them in the first place!) Where this is the case, then the  $\beta$ -coefficient of the whole corporation,  $\beta_c$  is just the value-weighted average of the  $\beta$ 's of the individual subsidiaries. Formally:

$$\beta_c = \sum w_s \beta_s$$

where  $w_s$  is the value of each subsidiary expressed as a fraction of total firm value, and  $\beta_s$  is the  $\beta$ -coefficient of each subsidiary. We can now see that the acquisition (or disposal) of any subsidiary whose individual  $\beta$  differs from the corporation average,  $\beta_c$ , must cause a change in  $\beta_c$ . Thus, even if interest rates remain unchanged and there is no change in the market's pricing of risk, the riskiness of the firm itself can change, causing a rise (or fall) in the required rate of return,  $\bar{K}$ .

Before leaving this discussion of short-term changes in share prices, remember that price movements only need events to be *expected*. If people *expect* an announcement of lower profits, they will sell as quickly as possible. They will certainly sell before the announcement itself; in fact the selling will drive prices down. And the selling will drive prices down even if the expectation turns out to be wrong. If the expectation is wrong, share prices may recover again after the announcement but that does not alter the fact that expectation caused the first movement. On the other hand, if the expectation turns out to be correct, there will be no further movement in prices at the time of the announcement. That is why, in Case Study number 1, the *Financial Times* report of the fall in US interest rates places so much stress upon the unexpected nature of the event. Asset prices fell because the rise in interest rates was 'news'. If it had been expected, it would already have been incorporated in the price and would have had little, if any, effect. In Section 11.5 we included a quotation from John Maynard Keynes which suggested an even more extreme role for expectations. According to Keynes, one did not even have to expect a piece of genuine economic news in order to make buying or selling the rational thing to do. One only had to think that other people expected some news and were going to buy or sell. Indeed, one might forget about news altogether and simply concentrate on what one thinks other people are going to do. If this is true then prices are not moved by events ('level 1') or even *expectations of*



events ('level 2') but by *expectations of other people's expectations* ('level 3'). In Keynes' words:

We have reached the third degree where we devote our intelligences to anticipating what average opinion expects the average opinion to be. And there are some, I believe, who practise the fourth, fifth and higher degrees.

(Keynes, *General Theory*, 1936, p. 156)

### 17.4.3 Whole market – long run

In the long run, the aggregate stock of company shares will expand. The supply curve will shift to the right. This happens because new firms are established and existing firms convert to joint-stock or 'corporate' status. Naturally, some firms will fail, while some firms will find it advantageous to buy in some of their existing shares. Nonetheless, one would expect a net increase in the aggregate stock of shares over time.

The speed at which this happens will depend to some extent on the state of the economy. When the economy is booming, firms have more need for new capital for expansion. Furthermore, it is likely that share prices themselves will be high in a boom because investors expect good profits and a high rate of growth of dividends. In Section 11.3.1 we went to some trouble to establish that the required rate of return on shares,  $\bar{K}$ , was the equivalent of the firm's cost of capital. High share prices, therefore, are equivalent to a low cost of capital.<sup>8</sup> When the cost of capital is low, firms will be encouraged to expand.

The net flow of new issues is likely to be particularly marked if the cost of equity capital is low relative to other sources of funds. This too can happen in a boom where a rise in the rate of inflation looks likely. Higher inflation rates may lead to higher interest rates and thus a reduction in the present value of all assets, but for equities higher inflation will mean a more rapid growth in nominal profits and, *ceteris paribus*, a higher rate of growth of dividends. There is no such compensation for bondholders whose returns are fixed in nominal terms. Thus, in the later stages of a boom, when investors become concerned about inflation, it is

not unusual for bond yields to rise relative to equity yields and thus for shares to become, relatively, a cheaper source of capital than bonds.

In the long run, then, we would expect a net increase in the stock of company shares, though the rate of expansion may fluctuate. In a market diagram, the continued rightward shift of the supply curve, other things unchanged, suggests a downward movement in prices, and a continuous shift to the right suggests a continuous downward price trend. This, clearly, is wrong. Share prices do sometimes fall dramatically and they do sometimes experience periods of long gentle decline but they do not suffer from a continuous decline. Equally, seen from the yield side, yields do not rise continuously with time. In the long run, real yields (that is, allowing for inflation) are commonly assumed to be 'stationary'.<sup>9</sup> From this, we are driven to the conclusion that, in the long run, the demand curve also shifts to the right, that is, the demand for shares also increases. And it is easy to see why this should be the case, especially if we recall the discussion in Sections 1.2.3 and 1.2.4. There is a *net* demand for financial assets every time a unit or sector saves in excess of its real investment. If we take households, for example, a sector which normally runs a financial surplus, households make a *net* acquisition of financial assets every year. A *net* acquisition means an acquisition in excess of disposals. Thus, each year there is a demand by households to add to their stock of wealth, and company shares, directly or indirectly via a managed mutual fund, will be part of the additional wealth that they wish to acquire.

As with shifts in supply, there will be fluctuations in the rate of shift. In a boom, with low unemployment and high incomes, the scope for aggregate saving will be greater and out of this greater saving there will be a more rapid acquisition of financial assets. The behaviour of demand for shares over time will also depend upon the attractiveness of shares as an investment relative to other assets. In the UK, for example, it was a frequent complaint from industry that there were too many incentives for households to accumulate housing wealth. These incentives included tax relief on mortgage interest payments and capital gains tax

<sup>8</sup> An informal way to understand this is to remember that in return for a given dividend payment the issue of one extra share raises more capital if its price is high than it does when its price is low.

<sup>9</sup> 'Stationarity' in a formal, statistical, sense means that a time series has a constant mean, variance and covariance. In other words, it does not matter from where we draw a sample of observations in the series, we get the same values. Clearly, this condition cannot hold if the data is subject to a time-related trend.

exemption on the sale of homes. Successive governments in the 1980s and 1990s began reducing the real value of the interest tax relief on house purchase and created tax incentives for investment in company shares using what were initially known as ‘Personal Equity Plans’ (PEPs) and later ‘Individual Savings Accounts’ (ISAs). Differences in the rate of growth of demand for and supply of company shares over time will lead to occasional trends in prices and yields, but these are trends which are quite quickly reversed.

#### 17.4.4 Individual shares – long run

Individual shares will, of course, be subject to the same long-run influences that apply to the equity market as a whole. Individual shares suffer from discriminatory tax regimes and benefit from market-side inducements to buy shares. Beyond these influences it is difficult to isolate long-run effects on *individual* shares because any long-run tendency is usually a signal for something to change. If, for example, a firm’s share price establishes a long-term downward trend because of declining earnings, and this performance is unique to that particular firm within a profitable sector, then the declining price is a sign of management failure and the firm will quickly become a takeover target. By contrast, an *individual* firm which is a runaway success will quickly find other firms diversifying into its area of activity and the growth in profits will eventually slow.

It is easier to identify trends for whole sectors or categories of firms. The fortunes of whole sectors tend

to be associated with structural changes in the economy, or with long-term technological change. Thus, after 1921, dividends on the shares in coal mining and railway companies steadily declined, and with them went the value of the shares. In both cases, the problem was one of the long-run development of rival products and technologies. By contrast, in the 1990s a new and fashionable sector emerged, under the general heading of ‘biotechnology’. These were firms set up to exploit recent technological breakthroughs in the manipulation of the genetic code in DNA. The ultimate prize was seen as the development of effective drugs for cancer, AIDS, arthritis and other afflictions which had so far resisted all conventional treatments. Many companies enjoyed the sight of their newly issued shares increasing rapidly in price even before they had produced any products for sale. This may be a sector set for long-run growth.

### 17.5 Equity market characteristics

Equities are issued in all countries by firms wishing to raise long-term capital but who have decided for some reason against the issue of long-term bonds. Table 17.1 gives some indication of the scale of this activity for a range of European bourses.

There are many ways in which the scale of stock market activity can be compared. As with bonds, raising new capital involves making new issues of shares (or additional issues of existing shares). This is the

**Table 17.1** European equity markets in 2004

	Capitalization <sup>1</sup>	Listed shares (no.) <sup>1</sup>		Turnover <sup>2</sup>	New issues <sup>2</sup>	
	(€m)	Domestic	Foreign	(€m)	Shares (no.)	Funds (€m)
Copenhagen	99,463.48	183	7	414.1	0	857
Deutsche Börse	857,312.00	676	172	26,885	0	0
Euronext <sup>3</sup>	1,660,196.00	1,029	n/a	9,435	6	6,440
Italian exchange	509,708.00	266	9	21,923.6	0	0
London Stock Exch.	2,031,870.00	2,330	370	463,451.2	80	6,564
Oslo Børs	85,047.30	157	19	3,110.4	3	707
Spanish Exchanges	601,911.80	n/a	n/a	1,004.2	n/a	6,146
Stockholmbörsen	245,250.70	259	18	11,439.7	2	1,424

Notes: <sup>1</sup> end-April 2004; <sup>2</sup> in 2004 (Q1); <sup>3</sup> Amsterdam, Brussels and Paris  
Source: Federation of European Stock Exchanges, *Monthly Factsheet*, April 2004.

primary function of a stock market and one might therefore use that as the basis for comparison. The final column of Table 17.2 shows how much was raised in the first quarter of 2004 and, on this basis, the London Stock Exchange comes first in the list though by only a very small margin. On any other basis, London's paramount position is obvious. Turnover figures record all the sales/purchases in a given period and for virtually all the exchanges it is clear that turnover greatly exceeds the funds raised by new issues – confirming that by far the greater part of stock market activity is secondary activity. Capitalization refers to the total value of all shares listed on the exchange. Looking at the London turnover figures (for the first quarter 2004) it seems clear that total trading on the London Stock Exchange is approximately equal to its total capitalization and getting on for 70-times the value of new funds raised.

### 17.5.1 Primary markets

As with bonds, the bulk of trading in equities involves the buying and selling of existing stock. However, a major consequence of this secondary market activity is that it supports a primary market in which investors are more willing to buy new issues, and provide new funds, knowing that they can subsequently sell the stocks quickly and cheaply if they so wish.

In most financial centres, the methods for making *new* issues of new ordinary company shares involve either a sale to the general public – a **public offer for sale** – or a placing. In each case a financial institution, usually a merchant bank or a securities trader, **underwrites** the issue. Underwriting involves the purchase of the stock on agreed terms from the issuer with the promise to distribute it subsequently to shareholders using one of the methods just described. The advantage to the issuing firm is that it knows both the quantity of funds that the issue will raise and the cost of those funds. Indeed, these will be agreed with the underwriter sufficiently far in advance that they will form part of the basis on which the firm decides whether or not to go ahead with the issue. Clearly, the underwriter is accepting a degree of risk in providing this service. Firstly, there is the risk that the issue may be overpriced with the result that the underwriter cannot subsequently dispose of the whole issue at that price or better. Secondly, there is the risk that although the price initially agreed was correct, the market falls between the time that the underwriter takes up the new issue and distributes it to

shareholders. Again, the underwriter is left with unsold stock. Because of the risk involved, it is common for large issues to be underwritten by a **syndicate**, a group of merchant banks or securities dealers.

New issues will take place when either a firm decides to raise funds by adding to the number of shares already in issue, or when a firm decides to raise funds by 'going public' for the first time. The former case is often described as a **rights issue** since existing shareholders are given a guaranteed opportunity to buy shares in the new issue, provided that they exercise the right within a specified period. The purpose of this is to protect existing shareholders from the enforced dilution of their holding in the firm. 'Rights' give the shareholder the opportunity to maintain his or her percentage of the ownership of the firm.

With rights issues, it is possible also to compare the price of new shares at the time of issue with those already being traded. It is usual to observe a discount. This is difficult to explain by reference to economic theory. Since the new shares, after issue, have exactly the same characteristics, benefits and risks as existing shares (indeed are indistinguishable from pre-existing shares) it is hard to see why they should have a different value. The explanation that is often advanced is that the discount represents a price that underwriters are prepared to pay to preserve their reputation. A new issue which is undersubscribed is often the source of comment in the financial press and might be thought to suggest poor judgement on the part of the underwriter(s). This might make it harder for them to attract underwriting business in future. If this is true, it is worth considering carefully who is really paying the price of protecting this reputation. If we assume that the need to sell at a discount to existing prices is built into the negotiations between the firm and the underwriter, then part at least of the discount at least is being met by the firm. In accepting that the shares will ultimately be issued at a discount, it is accepting a smaller volume of funds and thus a higher cost of capital than may be necessary.

### 17.5.2 Secondary markets

As we saw in Chapter 16, various trading structures are possible in securities markets. At the moment (2004) the London Stock Exchange is mainly a 'quote-driven, continuous' market, although 'order driven' trading in the shares included in the FTSE-100

### More from the web Stock exchange trading

While most major stock exchanges provide vast amounts of information, this is aimed largely at potential investors and at firms considering applying for a listing. Neither of these is assumed to be very interested in trading methods. The best place to look for any relevant information is under the heading 'members' since members are mainly the exchanges dealers or market-makers.

Just a reminder – the main European exchanges are:  
[www.londonstockexchange.com](http://www.londonstockexchange.com)  
[www.euronext.com](http://www.euronext.com)  
[www.deutsche-boerse.com](http://www.deutsche-boerse.com)

The one partial exception to this is Euronext whose website includes a .pdf document titled 'Euronext: organisation and procedures'. This can be accessed from the homepage by clicking on 'Private Investor' and then on 'Documents Centre'. (The 'Education Centre' also has some useful items.)

Probably more use, and certainly informative and entertaining, is the 'howstuffworks' website. Go to:  
[www.howstuffworks.com/stocks.htm](http://www.howstuffworks.com/stocks.htm)

This will display a page entitled 'How stocks and the stock markets work'. This provides an introduction but also has a drop-down contents list which gives access to more specialized discussions of 'A stock exchange' and 'Exchanges and brokers'. Other topics include the use of stocks and the stock market from firms' point of view.

index began in October 1997. Prior to 1986, quotes were made by jobbers who held inventories of stock and acted on their own behalf as principals. Under the pre-1986 rules, they could deal only with brokers, who acted as investors' agents. The same rules limited broking and jobbing firms to partnerships with unlimited liability and also permitted firms to work to a scale of fixed minimum commissions. During the 1960s and 1970s a number of pressures built up for change (Cobham, 1992). The event that finally forced a reappraisal of these arrangements was the removal of exchange controls in the autumn of 1979. Even before this, a certain amount of trading in UK securities was being carried out in other centres, mainly in New York where deregulation, economies of scale and new technology meant much lower commissions. The ending of exchange controls opened the flood

gates. UK fund managers diversified rapidly into overseas securities, dealing with overseas market makers. It was clear not just that minimum commissions made London uncompetitive but that the Stock Exchange member firms were simply too small to take on the large increased holdings of international stocks that investors now required and to exploit the economies of scale that the new trading and information technology offered. In the course of 1985 Stock Exchange members came to accept: (a) opening up membership of the Exchange to corporations with limited liability; (b) the ending of minimum commissions; and (c) the replacement of the broker–jobber roles by single capacity market makers. This opened the way for large financial institutions to become members and to invest heavily in the new screen-based technology.

Since 1986, it is these single capacity market makers who provide the quotes for the London market. The Stock Exchange regulations require market makers to quote continuous two-way prices at which they are prepared to deal in return for which they can display their quotes on the SEAQ (Stock Exchange Automated Quotations system) screens and have access to stock borrowing facilities and the TALISMAN electronic settlement system.

One obvious consequence of Big Bang was the arrival of many new firms and an injection of large amounts of capital into the London Stock Exchange. For some years, the obvious question was whether or not this increase in capital and participants improved the functioning of the market. For some years, therefore, the Stock Exchange published a quarterly, *Quality of Markets Review*. The criteria for assessment were (and remain):

- 1 **Liquidity:** Measured by 'turnover' (the value of transactions per period) and 'velocity' (the value of transactions as a proportion of the total value of securities listed).
- 2 **Depth:** Measured by the degree of competition and the ability of the market to trade large quantities of stock without affecting price. Trends in the former can be established by monitoring the number of market-makers for each type of stock and in the latter by examining the difference between the bid–offer price for different bargain sizes.
- 3 **Visibility:** Refers to the amount of information that is available to market participants.
- 4 **Transaction costs:** Measured by commission levels and bid–offer spreads.

The benefits of Big Bang quickly became apparent, although figures for turnover and velocity were adversely affected by the 1987 Stock Market crash and didn't recover until 1998. But visibility has certainly increased dramatically, aided by technological developments which allow large amounts of information to be available on-screen at the touch of a button. Bid-offer spreads and commissions have generally declined for all bargain sizes. For some years, in the early 1990s, it looked as though 'retail' investors were being left out of the benefits by commissions which remained stubbornly high for the smallest deals. But even this problem declined from the mid-1990s with the development of internet and on-line brokerage services. Even the data provided to the general public by the Stock Exchange itself has increased. Instead of a quarterly review of market efficiency, the London Stock Exchange now publishes Monthly and Annual Reports which contain data for primary and secondary, main and AIM, markets, and which show much greater detail than that required to judge 'quality'. The reports are available online at the Stock Exchange's website ([www.londonstockexchange.com](http://www.londonstockexchange.com)).

Many of the major upheavals of the London market have since been reproduced in other European markets, partly because of the competition that the reformed London market posed.<sup>10</sup> If we summarize the core of the London reforms as having four elements – continuous electronic trading, dual capacity, liberalization of commissions and freedom of entry – then by 1990 the *Paris Bourse* had adopted them all, Frankfurt moved to a similar system in 1995 and Madrid and Milan were committed to reform on lines identical to the Paris model. In detail, the Paris arrangements differ from those of London insofar as the market makers (*Sociétés de Bourse*) operate a computerized auctioneer system of trading. They do not normally quote continuous two-way prices but execute deals when buy and sell orders cross. In the typology of Figure 16.7, Paris (and the other European markets following the same pathway) are 'continuous auction' rather than 'continuous dealer' markets. More information about the auction markets of Amsterdam, Brussels and Paris can be found by following the links from [www.euronext.com](http://www.euronext.com) detailed on p. 361.

In a continuous auction market, buyers and sellers submit orders to the market maker specifying

respectively an upper and lower limit at which they are prepared to trade. Buy orders are then matched to sell orders, so far as possible, by computer and a price is struck and declared. Any offers which cannot be executed at that price are kept until the price moves within their limit or the instruction to buy or sell is withdrawn. Compared with the quote-driven or dealer system it is immediately apparent that the order-driven system apportions the risk rather differently. In a dealer system, the dealer holds inventories of stocks on his or her own behalf, to which s/he adds the sell stocks that s/he receives and from which s/he executes buy orders. Clearly the price of this inventory will fluctuate with changes in the market price of stocks. Meanwhile, the buyer/seller has the advantage of knowing with certainty the price at which his or her order will be executed. In an auction system, the market maker holds no significant inventories and accepts no stocks except in so far as s/he matches them instantly with a buyer. The counterparties to the transaction, however, cannot know in advance the exact price at which their order will be carried out. The risk to the latter is moderated by the setting of price limits and by the fact that auction markets, just like dealer markets, display continuous and detailed trading information on screen which enables potential buyers and sellers to see the price at which the last trade was carried out and any trend that might be developing.

It is difficult with such a short period for comparison to draw general conclusions about the quality of market provided by the London and European models since only Paris and London have any established record. The papers by Pagano and Roell (1990, 1992) attempt some preliminary suggestions. An interesting finding is that for average size deals in the 16 stocks traded on both SEAQ (in London) and CAC (in Paris), the *fourchette*, effectively the bid-ask spread, in Paris, is smaller than the *touch*, in London. Even more interesting was their observation that the touch on these stocks in London doubled when the CAC was closed. However, the average size of deal in Paris was smaller than in London and there were very few large trades. Thus, in terms of our indicators above, there is some evidence that transaction costs are lower on deals in Paris but also that the market lacks depth and visibility when compared with London. The lower

<sup>10</sup> For a detailed discussion of the reforms in French and German securities markets after 1986 see Story (1995), especially pp. 24–53.

transaction costs observed in continental auction systems explain the decision to adopt trading of FTSE-100 shares in London from October 1997.

With motives similar to those which drove the Paris reforms, the German government announced far-reaching plans for the equities market in 1992. The proposals to create *Finanzplatz Deutschland* (the 'German financial marketplace') include: bringing the country's eight stock exchanges together into one major market in Frankfurt;<sup>11</sup> abolishing the stock exchange turnover tax; creating a centralized regulatory body; encouraging the creation of a futures and options exchange; the introduction of money market mutual funds; and the computerization of stock trading. We noted at the beginning of this chapter that personal ownership of shares is limited in Germany. This is just one aspect of the lack of an 'equity culture'. The stock market plays a very small role in the financing of firms. There are fewer than 900 listed companies and liquidity is very limited in all but the few largest firms. Bank finance plays a much more important role and even where firms are listed, the shares are very often held by a few institutions, mainly banks themselves. Even insurance companies, large holders of equities in the UK and USA, hold over 80 per cent of their portfolios in government bonds.

For firms, the listing of their shares on an organized stock exchange carries many advantages. Principal amongst these is that very large amounts of capital can be raised at a reasonable cost because the ownership and risk is widely dispersed amongst investors who can relinquish their commitment quickly and easily. However, 'listing' invariably carries considerable costs and obligations. Costs come in the form of payments to the exchange itself and also in the form of 'disclosure requirements'. Firms with a stock exchange listing are required to make certain categories of financial information continuously available to the general public and to publicize any major changes that occur to their circumstances. These obligations are intended to reduce the information advantage which firms have over their shareholders and thus provide some degree of protection for the latter. Because of these costs, small and medium-sized firms are often deterred from applying for a listing on a major stock

exchange and this has led most countries to develop second- (or even third-) tier markets, with lower charges and less demanding obligations. For example, in the UK until the mid-1990s small firms were able to join the Unlisted Securities Market (USM) which opened in 1980. The desire by the European Union to standardize stock exchange listing requirements (see *Bank of England Quarterly Bulletin*, May 1990) led to the conditions for USM membership becoming so similar to those of the main markets that the two were merged in 1996. The requirement for a market with low entry and compliance costs remained, however, and this has been provided since 1996 by AIM, the alternative investment market.

### 17.5.3 Reading the *Financial Times*

Up-to-date information on activity in equity markets is carried in all serious newspapers that report business news. It is also available increasingly these days on television screen text services such as Ceefax or Teletext. For professional investors, very detailed and sophisticated 'real-time' data is available by telecommunication from commercial suppliers. One of the most comprehensive services of information readily available to the general public, however, is provided by the *Financial Times*, in its UK and European and US editions.

*Data* on share prices, changes, yields and *P/E* ratios is listed on two pages headed 'London Share Service'. Shares are grouped according to the principal activity of their firms. Look again at Box 17.5 which contains data for the Beverages sector. The purpose of the groupings is, obviously, to make it easy for investors to find the company in which they are interested (companies are listed alphabetically within each sector) but it also has the important effect of making it easier for investors to compare data across similar types of firm. When we discussed *P/E* ratios (and the data in Box 17.5), recall, we stressed how important it is to compare like with like. As we would expect, the data for individual shares includes the price at the previous day's close, the change during the day, the highest and lowest price within the last 52 weeks, the dividend yield (before tax) and the *P/E* ratio.

<sup>11</sup> Germany is a federal state and the tendency for each of the *Länder* to have its own financial institutions and regulators is a legacy of the decentralization of the financial system forced upon Germany by the Allies in the period of post-war reconstruction (Marsh, 1992). In practice, there are three major securities markets: Frankfurt, Düsseldorf and Munich. The figures from all eight exchanges are aggregated in Table 17.2.

*Commentary* on equity price behaviour is spread over three pages. The first of these, 'Stock Markets and Currencies', carries reports mainly on overseas stock markets. A table, 'World Markets at a Glance', shows the recent movement in stock market indices in around 60 countries. The 'Capital Markets & Commodities' page reports on major price events in world stock markets and has a list of world commodity prices. The back page is dominated by four regular features. The first is the 'Global Overview', a summary of market trends in the US, UK, Europe and Japan. The second, 'London', lists the major share price movements and usually offers a very brief explanation. This is accompanied by a table headed 'Main Movers' which lists the shares showing the largest percentage price changes. The final item of interest is a table showing 'Trading Volume'. This lists the number of shares traded (in thousands) for each of the shares in FTSE-100 index. The table shows a remarkable range of trading volumes. In some cases this can be as small as a few hundred thousand, while in others it can be several hundred million. Furthermore, the table teaches us a useful lesson in that it shows that the volume of trading is no guide to the scale of price movements. On 25 May 2004, for example, the table shows that 234m shares in Vodafone were traded the previous day and the price fell by just 0.75p. However, shares in Carnival, the cruise operator, jumped by 30p (approximately 4 per cent) on a turnover of just 0.7m. What matters to price movements is the balance of buyers and sellers thinking the price is too high or too low. In the case of Vodafone, the figures tell us that there were many people wishing to buy the shares thinking that the current price was about right, while there were approximately as many wishing to sell at close to the current price. In the case of Carnival, there may not have been many buyers or sellers, but amongst the buyers there was clearly a view that the shares were substantially underpriced.

Much of the information reported about share price movements comes in the form of an index number.

Most of the data, however, is 'summary' data. This includes 'Best (and Worst) performing sectors' but mainly it is index data of some form. Because there are so many different shares listed, the only manageable way to describe and to measure the behaviour of the market as a whole, and especially over a long period of time, is to use an index number. One obvious and important use for such an index is to tell us the rate of

return on a broad portfolio of stocks which could be used to approximate  $K_m$ , the whole market return, in the capital asset pricing model. The *Financial Times* publishes nine broad-based share price indices, which it has developed with the help of the Faculty and Institute of Actuaries. (We saw in the last chapter that the latter decide on the design and the components of the index, while the *FT* collects the data and calculates the index value.) The most commonly quoted index is probably the *Financial Times Stock Exchange 100* (FTSE-100 or 'Footsie' for short). This is a 'real-time' index, meaning that it reflects changes in the price of its constituents as they actually happen. It was introduced in February 1984 (the others began in 1962) when a new futures contract based on UK equity prices was launched and needed a continuous record of market price movements. The components of the index are the 100 largest UK firms judged by their market capitalization. It is thus a weighted average, unlike the US 'Dow industrial average' which is, as its name implies, simply the average of (the largest) 30 industrial firms. Membership changes, obviously, as firms merge, or get taken over, and as relative market values change. There is a certain amount of status involved in membership of the FTSE 100 but more important from a practical point of view is that there appears to be a 'membership effect'. When a firm joins the index, its share price tends to rise (and to fall, when it leaves). This is because the performance of many investment funds is judged against the index and therefore fund managers feel it appropriate to hold a significant stake in each of the index's constituents in their fund. The other FTSE indices are larger. The *FTSE All-Share* contains over 800 stocks. Other indices contain 250 or 350 shares or include only small companies (the *FTSE SmallCap*). Being much larger, movements in these indices are calculated less frequently, usually on a daily basis. The statistical calculation of these indices is explained by the *Financial Times* itself (Greenhorn, 1985) and the details of the constituent firms (in each index) and their weighting within the index are published quarterly in the *FT*. The 'London Stock Exchange' page also has a table containing index data for 37 industrial groups. For every index, the data provided includes the current value of the index, the previous day's change, and the index value for each of the three previous days and a year ago. In addition, the figures include the average gross dividend yield for the stocks in the index as well as 'net cover' (the number of times by which earnings

### Box 17.6 European markets report

It is very clear from the report of European markets that follows that individual equities are often affected by events in other countries. The report describes small falls in a wide range of equity market indices including New York, London, Paris and Frankfurt. The explanation that it offers is linked to interest rate expectations. As we know from earlier discussions, the base level of interest rates is set by central banks and their prime concern is the future development of the rate of inflation. The report suggests that inflationary pressures may be growing because of the very high price of oil ('... in the wake of its strong rally'). The implication is that these inflationary pressures may encourage central banks to raise interest rates sooner rather than later and we know from this chapter that if interest rates rise, this raises the rate at which the future income from any asset is discounted and that this reduces its present value.

To some extent, the internationalization of influences on equity prices is just one aspect of the general process of globalization. The major investment banks have branches in all the major financial centres and the technology allows them to move funds quickly and cheaply between these centres. A rise (for example) in US share prices lowers the rate of return on US equities, *ceteris paribus*, and makes investment in other financial centres relatively more attractive so that funds flow into their securities markets. Thus, although individual economies may show limited convergence (so that profit growth rates can sometimes be higher in the USA than in Europe, and vice versa) it is unusual for European stock exchanges not to be affected by developments in US stock prices. This obviously limits the benefits of international diversification.

In the present case, however, the generally depressed nature of the day's trading is more readily explained by the fact that the threat to share values is a genuinely international threat. Oil is a major resource in all developed economies and the substantial rise in its price that occurred in the spring of 2004 would tend to raise prices worldwide. In those circumstances, higher interest rates would be a widespread possibility.

## Bourses drift ahead of long weekend break

By Neil Dennis

European stock markets remained a fraction lower in mid-afternoon trade on Friday as Wall Street got off to a lethargic start ahead of a long weekend break in the US and UK.

The FTSE Eurotop 300 index was down 0.3 per cent at 985.08, while Frankfurt's Xetra Dax was 0.4 per cent lower and the CAC 40 in Paris was off 0.6 per cent. London's FTSE 100 shed 0.4 per cent.

In New York, the Dow Jones Industrial Average was down 0.1 per cent and the technology-heavy Nasdaq Composite index was 0.2 per cent lower.

Investors on both sides of the Atlantic were keeping a close watch on the price of oil in the wake of its strong rally, which helped fuel fears of inflation and an earlier than expected rise in US interest rates.

Another focus was UK retailer **Marks and Spencer**, after retail tycoon Philip Green announced his interest in the clothing and food store.

Although the company has received no formal bid, Mr Green said he was preparing a cash and shares offer and would approach the board in the coming days. After rising 18 per cent on Thursday, M&S shares put on another 4.4 per cent to 360p.

**Deutsche Post**, the German mail, logistics and banking group, added 1.1 per cent to €16.42 in spite of a memo from Deutsche Bank, one of the co-ordinators behind the group's attempt to bring its Postbank unit to market, which valued the division at around €5.3bn, well short of the €6bn targeted.

Deutsche Bank said the memo was two weeks old and was merely technical guidance rather than a calculated valuation.

**Hochtief**, the German construction company, was down 0.6 per cent to €17.97 after it said it was bidding for Canadian builder Aecon Group. Hochtief, a minority share-

holder in Aecon, said it had offered C\$6.95 (\$5.08) a share for the 52 per cent of the company it does not already own.

Shares in Italian carmaker and industrial group **Fiat** rose 1.6 per cent to €5.76 in spite of uncertainty at the top following news of the death of Umberto Agnelli, the chairman, who lost his battle against cancer aged 69.

**Ahold**, the Dutch retailer, received its official warning from Euronext, the stock market operator. Euronext said the company had broken listing rules, accusing it of failing to report accounting irregularities at its US Foodservice division last year. But shares in the company were up 1.3 per cent at €6.35.

An upgrade from UBS to 'buy' for Anglo-Dutch household products group **Unilever**, drove shares in the company 3.5 per cent higher to 518.5p. The Amsterdam-listed shares rose 3.1 per cent to €54.10.

Source: *Financial Times*, 28 May 2004.



exceed dividend payments)<sup>12</sup> and the *P/E* ratio. We are reminded again of the importance and frequency of relative valuation since these are intended to be useful benchmarks against which to judge the characteristics of individual shares.

The other page of commentary is headed 'World Stock Markets' and is divided into sections reporting on 'Americas', 'Europe' and 'Asia Pacific'. Once again, the intention is to give some explanation of the latest movement in each market as a whole, but the range of markets to be covered means that activity in individual shares is reported only when dramatic. (News about individual firms is more likely to be found in the 'Companies and Finance: Europe' pages, elsewhere in the paper.) The European market news published on 28 May 2004 is shown in Box 17.6.

As with London, other markets also express general movements in asset prices by the use of indices. The French CAC (*Cotation Assistée en Continu*) index began in 1987 when the Paris Bourse reforms began. Like the FTSE-100 it is recalculated continuously while the market is open. It is also a weighted average index, the weights being derived from the comparative capitalization of the 40 shares included in it. As with most share price indices, the  $n$  shares which comprise the index are the  $n$  largest shares (by capitalization) in the market, but the CAC-40 takes the largest firms from each sector, rather than the 40 largest in the market as a whole.

The German DAX (*Deutscher Aktienindex*) is another index which calculates a total return by adding dividend payments to the change in capital value of a weighted average of the top 30 shares. Germany has a number of regional markets which, though smaller than Frankfurt, are more significant than regional exchanges in France or the UK. The DAX incorporates price changes from all the country's exchanges. It is a real-time index, unlike the

*Commerzbank* index which is calculated only once a day and is based upon a weighted average of the top 60 shares quoted on the Düsseldorf exchange.

## 17.6 Summary

'Equities' are ordinary company shares. Their holders are the legal owners of the firm and their shares bring them benefits in the form of dividend payments, which are a claim on the firm's profits, and capital appreciation, as the firm's earnings increase. The 'fundamental' analysis of shares involves the discounting of future dividend earnings though analysts sometimes use *P/E* ratios and asset values. 'Technical' analysis, by contrast, studies the past behaviour of share prices. Like all prices, the prices of shares change when there is a shift in demand, or supply, or both. With shares, such shifts occur when investors change their view of the appropriate value for the share, whether this view comes from dividend discounting, asset values or past price movements. There are many events that cause investors' valuations to change. More importantly, we need to remember that the price of any financial asset will change merely because investors expect an event to happen, whether it actually does so or not.

Once issued, shares are traded in secondary markets where a variety of trading arrangements are possible. Since 'Big Bang' the London Stock Exchange has been organized as a continuous dealer market although major shares are now traded on a continuous auction basis. Continental equity markets have been caught up in the reform trend in order to compete with London and have acquired similar characteristics. However, European markets have generally opted for continuous auction rather than continuous dealer trading structures.

<sup>12</sup> For example, 'net cover' of 2 means that earnings were twice the level of dividends. Thus, taking the reciprocal of net cover is one way of estimating the payout ratio (see Section 17.3.1).

### Key concepts in this chapter

Articles of association	Payout ratio	Technical analysis
Ordinary shares	Dividend irrelevance hypothesis	Offer for sale
Common stock	Constant growth model	Placing
Equities	One-period model	Underwriter
Shares in issue	Two-period model	Syndicate
Authorized shares	Three-period model	Liquidity of markets
Preferred shares	Price/earnings ratio	Depth of markets
Dividend	Asset values	Visibility
Retention ratio	Rights issue	Transaction costs

### Questions and problems

- 1 Wilton Wayfarers plc is a chain of travel agents whose earnings have grown steadily at 12 per cent p.a. for several years and are expected to do so for the foreseeable future. Calculate the equilibrium price for their shares if the three-month treasury bill rate is 6 per cent, the shares have a  $\beta$ -coefficient of 1.2 and the return on the *FTSE-100* portfolio is currently 18 per cent.
- 2 What new price would you predict for these shares if the Bank of England raised the treasury bill rate to 7 per cent, *ceteris paribus*?
- 3 What is rate of return to shareholders in (2) above?
- 4 Why is this rate of return also the firm's cost of capital?
- 5 Explain what is meant by the *retention ratio*.
- 6 Explain why an increase in the retention ratio may have no effect on the value of a firm's shares. Specify carefully the assumptions that you need to make for this to be true and work a numerical example to illustrate it.
- 7 Explain what is meant by a *P/E* ratio and discuss how it may be used to value the shares of a firm.
- 8 In Box 17.5, Scottish and Newcastle (a long-established UK brewer) has a *P/E* ratio of 13.5, while SABMiller (a South African brewer) has a *P/E* ratio of 18.5. Does this mean that SABMiller is overpriced? Explain your answer.
- 9 After careful consideration, Wilton Wayfarers plc decides to drop African adventure holidays from its range of package tours since political uncertainties have made earnings from these tours extremely variable. It decides to put more effort into marketing European weekend breaks, for which there has always been a steady demand. Use the capital asset pricing model to analyse the likely effect upon the required rate of return on Wilton's shares and use a supply and demand diagram to show how this change will affect the share's price.
- 10 Explain what is meant by a 'quote-driven continuous market' for securities. What advantages does it have over other types of trading arrangement?

## Further reading

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## Chapter 18

# Foreign exchange markets

*What you will learn in this chapter:*

- Reasons for the growth of the foreign exchange market
- How to read the *Financial Times* currency tables
- The application of the efficient markets hypothesis to foreign exchange markets
- The determinants of forward exchange rate premiums and discounts
- The roles played by arbitrageurs and speculators
- The problems associated with forecasting forward rates of exchange

## 18.1 Introduction

The foreign exchange (forex) market allows payments to be made across national boundaries by establishing the prices of national currencies in terms of other currencies. The product (foreign exchange) consists of national currencies, each of which has an exchange rate with every other currency. Exchange rates should, in theory, be determined in markets by the forces of demand and supply, although in practice the exchange of the currencies of most developing countries is so heavily controlled by governments that the official rates of exchange have little to do with market forces.

Market participants can be split into five groups:

- *End users* of foreign exchange: firms, individuals and governments that need foreign currency in order to acquire goods and services from abroad or to move capital as part of their regular economic activities.
- *Market makers*: large international banks which hold stocks of currencies to allow the market to operate continuously and which make their profits through the spread between buying and selling rates of exchange.
- *Speculators*: banks, firms and individuals that attempt to profit from outguessing the market.
- *Arbitrageurs*: banks that make profits from buying in one market at the same time as selling in another, taking advantage of small inconsistencies which develop between markets.
- *Central banks* which, on behalf of their governments, enter the market to attempt to influence the international value of their currency – perhaps to protect a fixed rate of exchange, or to manage to varying degrees an allegedly market-determined rate.

It is clear from this list that it is possible to play multiple roles in the market. For instance, international banks may act in up to four capacities, while firms and governments may be end users on occasions, speculators on others.

In Section 11.4 we met the notion that the price of an asset can be explained by the rational behaviour of end users of the asset trying consistently to maximize the benefit from some real economic activity. In such a case, the price may be said to be determined by its underlying **fundamentals**. We can identify the fundamentals of an exchange rate as economic factors that are important influences on the current and capital

accounts of the balance of payments. These include relative productivity, relative rates of inflation and interest rate differentials across countries. Changes in these basic influences on demand and supply cause exchange rate adjustments. According to this view, an exchange rate is always either at an equilibrium rate or moving towards a new equilibrium position. Unfortunately, it is hard to discern in the everyday behaviour of the markets any tendency towards anything we might think of as equilibrium.

It is difficult even to define an equilibrium position. One common idea is that the equilibrium exchange rate is the rate that produces balance in the balance of payments but since countries trade with many partners, and balance of payments equilibrium does not require balance with each trading partner, this does not give us a clear idea of the desirable exchange rate between the domestic currency and any one foreign currency. There may also be grounds for desiring the set of exchange rates that produce balance in the balance of trade rather than in the overall balance of payments. An influential alternative view of equilibrium stresses the role of the exchange rate in maintaining **purchasing power parity** among countries.

### 18.1.1 The growth in the size and complexity of the market

The increasing interdependence of countries in recent years has led to a dramatic growth in the proportion of financial transactions with an international aspect. As exports and imports have grown as a percentage of the GDP of all developed countries, so too has the proportion of firms earning foreign exchange and/or requiring foreign currencies to purchase raw materials or intermediate goods. Because exchange rates may change rapidly, such firms are exposed to **foreign exchange risk** – the risk that losses may arise from rises or falls in the value of a currency in terms of the domestic currency. Firms have sought to protect themselves against this risk and to seek profits through speculation. The desire to protect against risk has led to the development of markets designed to provide insurance (forward, futures and options markets) and the exploitation of techniques such as interest rate and currency *swaps* which involve the simultaneous exchange of spot and forward contracts. As Table 18.1 shows, the market grew rapidly up until 1998 but then turnover began to decline.

**Table 18.1** Global foreign exchange market turnover<sup>1</sup>  
Daily averages in April (US \$bn)

	1989	1992	1995	1998 <sup>2</sup>	2001
Spot transactions	317	394	494	568	387
Outright forwards	27	58	97	128	131
Foreign exchange swaps	190	324	546	734	656
Estimated gaps in reporting	56	44	53	60	26
Total 'traditional' turnover	590	820	1,190	1,490	1,200
Turnover at April 2001 exchange rates <sup>3</sup>	570	750	990	1,400	1,200

<sup>1</sup> Adjusted for local and cross-border double-counting. <sup>2</sup> Revised since the previous survey. <sup>3</sup> Non-US dollar legs of foreign currency transactions were converted from current US dollar amounts into original currency amounts at average exchange rates for April of each survey year and then reconverted into US dollar amounts at average April 2001 exchange rates.  
Source: BIS, *Triennial Central Bank Survey. Foreign exchange and derivatives market activity in 2001* (Basle, March 2002), adapted from table B.7.

The table shows that the estimated average daily turnover at April 2001 exchange rates grew by 31.5 per cent between 1989 and 1992, 32 per cent between 1992 and 1995 and 41.4 per cent between 1995 and 1998 but then fell back by 14.3 per cent between 1998 and 2001. A significant factor in the decline in turnover was the introduction of the euro at the beginning of 1999, eliminating trading among the previously separate euro area currencies. The reduction in foreign exchange transactions within the euro area following the advent of the euro is shown in Table 18.3. In April 1998, euro area currencies were involved in 52.5 per cent of all foreign exchange transactions. By April 2001, this had fallen to 37.6 per cent.

Table 18.1 also shows the steady increase in the value of outright forwards and foreign exchange swaps transactions relative to spot transactions. In 1989, spot transactions made up 53.7 per cent of the average daily turnover in the market but by 2001 they accounted for only 32.25 per cent. As is shown in Table 18.2, the London market remains clearly the biggest market. Other important foreign exchange markets in order of size are: New York, Tokyo, Singapore, Frankfurt, Zurich and Hong Kong.

Although people associate the demand for foreign exchange with the needs of international trade, these accounted for only a small proportion of the explosion during the 1990s in the number of foreign exchange transactions. A much higher proportion derived from the great increase in international capital mobility. Both large multinational firms and governments have

sought to tap international capital markets to widen their access to funds and/or to lower the costs of borrowing. To meet these demands, international banks have grown hugely in size, new markets have opened up and expanded (most notably the Euromarkets), and new instruments have been developed. As well as the growth shown here in spot and forward exchange rate transactions, there have been major developments in derivatives contracts on foreign exchange and interest rates. The complexity of the market is shown by the fact that some 90 per cent of all transactions were in the interbank market, rather than involving end users. The importance of specific currencies also changes over time: trades involving sterling fell from 15 per cent to 11 per cent between 1989 and 1998, only to rise again to 13.2 per cent in 2001 following the advent of the euro. As is shown in Table 18.3, the US dollar remained the most used currency, still being involved in nearly 90 per cent of daily turnover.

The combination of increasing international interdependence and uncertainty has given governments a greater interest than ever in movements in the international value of their currencies. The increased volatility of exchange rates, as the world has lurched between systems of fixed and floating exchange rates, with varying degrees of government intervention, has led to much attention being paid to attempts to forecast changes in them. To understand why exchange rates fluctuate as much as they do, we need to look closely at the nature of exchange rates and the functioning of foreign exchange markets.

**Table 18.2** Geographical distribution of reported foreign exchange market turnover<sup>1</sup>  
Daily averages in April in %

Country	1989	1992	1995	1998	2001	Country	1989	1992	1995	1998	2001
UK	25.6	27.0	29.5	32.5	31.1	Italy	1.4	1.5	1.5	1.4	1.0
USA	16.0	15.5	15.5	17.9	15.7	Luxembourg	–	1.2	1.2	1.1	0.8
Japan <sup>2</sup>	15.5	11.2	10.2	6.9	9.1	Norway	0.6	0.5	0.5	0.5	0.8
Singapore	7.7	6.9	6.7	7.1	6.2	Belgium	1.4	1.5	1.8	1.4	0.6
Germany	–	5.1	4.8	4.8	5.4	Korea	–	–	–	0.2	0.6
Switzerland	7.8	6.1	5.5	4.2	4.4	Russia	–	–	–	0.4	0.6
Hong Kong	6.8	5.6	5.7	4.0	4.1	South Africa	–	0.3	0.3	0.5	0.6
Australia	4.0	2.7	2.5	2.4	3.2	Spain	0.6	1.1	1.1	1.0	0.5
France	3.2	3.1	3.7	3.7	3.0	Ireland	0.7	0.6	0.3	0.5	0.5
Canada	2.1	2.0	1.9	1.9	2.6	Austria	–	0.4	0.8	0.6	0.5
Netherlands	1.8	1.9	1.7	2.1	1.9	Mexico	–	–	–	0.5	0.5
Sweden	1.8	2.0	1.3	0.8	1.5	Poland	–	–	–	0.2	0.5
Denmark	1.8	2.5	2.0	1.4	1.4	Other	1.2	1.3	1.5	2.0	2.9

<sup>1</sup> Adjusted for local double-counting ('net-gross'). Estimated coverage of the foreign exchange market ranged between 90 and 100% in most countries. <sup>2</sup> Revised for 1998. <sup>3</sup> Data cover interbank transactions only.

Source: *Triennial Central Bank Survey. Foreign Exchange and Derivatives Market Activity in 2001*, adapted from table B.7, Basel, Bank for International Settlements (BIS, 2002), the full publication is available for free on the BIS website, [www.bis.org](http://www.bis.org)

**Table 18.3** Currency distribution of global foreign exchange market turnover<sup>1</sup>  
Shares of average daily turnover in April in %

Currency	1989	1992	1995	1998 <sup>2</sup>	2001
US \$	90.0	82.0	83.3	87.3	90.4
Euro	–	–	–	–	37.6
DM <sup>2</sup>	27.0	39.6	36.1	30.1	–
French franc	2.0	3.8	7.9	5.1	–
ECU & other EMS	4.0	11.8	15.7	17.3	–
£	15.0	13.6	9.4	11.0	13.2
Swiss franc	10.0	8.4	7.3	7.1	6.1
Swedish krona <sup>4</sup>	–	1.3	0.6	0.4	2.6
Yen	27.0	23.4	24.1	20.2	22.7
Canadian \$	1.0	3.3	3.4	3.6	4.5
Australian \$	2.0	2.5	2.7	3.1	4.2
Hong Kong dollar <sup>4</sup>	–	1.1	0.9	1.3	2.3
Singapore dollar <sup>4</sup>	–	0.3	0.3	1.2	1.1
Emerging market <sup>4,5</sup>	–	0.5	0.4	3.0	5.2
Other currencies	22.0	8.5	7.9	9.3	10.1
All currencies	200.0	200.0	200.0	200.0	200.0

<sup>1</sup> Whenever reported on one side of transactions. Figures are adjusted for local and cross-border double counting, except for 1989.

<sup>2</sup> Revised since the previous survey. <sup>3</sup> Data for April 1989 exclude domestic trading involving the DM in Germany. <sup>4</sup> For 1992–98, the data cover home currency trading only. <sup>5</sup> For 1992 and 1995, South African rand; for 1998 and 2001, Brazilian real, Chilean peso, Czech koruna, Indian rupee, Korean won, Malaysian ringgit, Mexican peso, Polish zloty, Russian rouble, Saudi riyal, South African rand, Taiwan dollar and Thai baht.

Source: *Triennial Central Bank Survey. Foreign Exchange and Derivatives Market Activity in 2001*, table B.4, Basel, Bank for International Settlements (BIS, 2002), the full publication is available for free on the BIS website, [www.bis.org](http://www.bis.org)

## 18.2 The reporting of foreign exchange rates in the *Financial Times*

Every Monday, the *Financial Times* publishes a table of world currencies which covers approximately 200 countries and some 150 different currencies,<sup>1</sup> ranging from the Afghanistan Afghani to the Zimbabwe dollar, including such well-known currencies as the Pataca, the Colon and the Dong. As well as each currency being used by residents within their own country, there is certain to be some international demand for it to allow the purchase by foreigners of domestic goods and services (every country has some foreign tourists, journalists and diplomats). The international demand for most currencies, however, is small. Foreign citizens and firms are unwilling to accept many currencies in settlement of debt and governments do not hold them in their foreign exchange reserves or use them to intervene in currency markets. This may be because of foreign exchange risk or *sovereign* or *political* risk – the fear that government regulations may prevent or restrict the conversion of a currency into other currencies. Currencies which are not fully convertible are not part of international liquidity (the world money supply). Only the currencies of a few industrial countries are willingly held by other governments and are part of the international trading system. A small number of these currencies (key currencies) are freely used in transactions not involving the issuing countries and are used by central banks to intervene in foreign exchange markets (intervention currencies). Nonetheless, there remains the potential for a set of market-determined exchange rates for each currency. Even where such a market does not exist officially, there are black markets, expressing demand and supply conditions.

Such demand and supply conditions can be shown in a standard diagram. However, care needs to be taken in the definition of the rate and in the labelling of the axes of exchange rate diagrams. Because an exchange rate is a relative price, it can be expressed in either

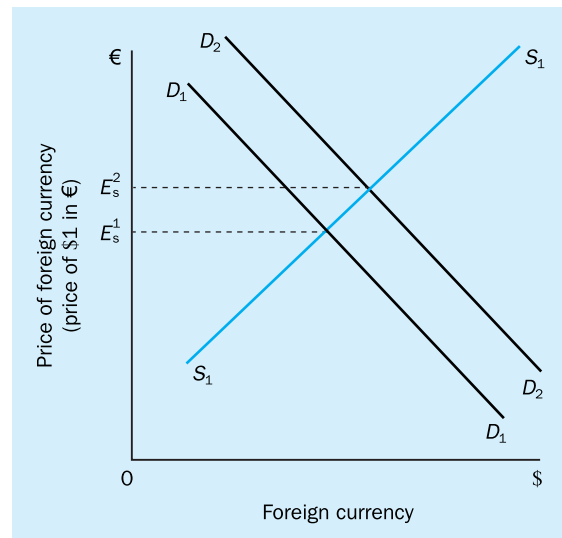
direction – if the pound goes up against the dollar, the dollar goes down against the pound. If we are interested in the exchange rate of the euro (€) it is logical to think of it as our medium of exchange, or numéraire, and to express the price of all other currencies in terms of the euro. This should lead us to ask:

How much in euro does it cost to buy \$1, ¥100 (Japanese yen), £1 (British pound or sterling) or SFr1 (Swiss francs) . . . ?<sup>2</sup>

The answer to this question takes the form:

$$\begin{aligned} \text{€}0.818 &= \$1; \text{€}0.739 = \text{¥}100; \\ \text{€}1.468 &= \text{£}1; \text{€}0.639 = \text{SFr}1. \end{aligned}^3$$

We are quoting the price of the foreign currency in each case (the domestic currency is being quoted against the foreign currency). This is known as the **direct quotation** (denoted by  $E_s$ ) of the exchange rate and is the form used in most countries. Figure 18.1 shows the expression of market conditions in this form.



**Figure 18.1** Supply and demand using direct quotations

<sup>1</sup> Although most countries have their own currencies for internal purposes, not all countries do so, because there are some monetary unions in which a single currency is used in a number of independent countries.

<sup>2</sup> For ease of expression, currencies whose basic unit has only a low value are quoted in terms of tens or hundreds. Thus, exchange rates are expressed in tens for the Danish, Swedish and Norwegian krone while the Japanese yen is expressed in terms of hundreds, for example, US\$0.920 = ¥100 (Japanese yen).

<sup>3</sup> These are the exchange rates quoted in the *Financial Times* on 16 March 2004. All currency symbols used in this text are those used on the 'Currencies, Bonds and Interest Rates' page of the *Financial Times*.



Note that on the vertical axis we have the price of the foreign currency (\$) in terms of the home currency (€) – the price of US\$1 in euro. On the horizontal axis, we have the quantity of the foreign currency (\$) supplied and demanded. Note further that if there is an increase in demand for dollars (the demand curve shifts up from  $D_1D_1$  to  $D_2D_2$ ), the exchange rate rises (from  $E_s^1$  to  $E_s^2$ ). That is, it now costs more euro to buy \$1 than before – the value of the euro has fallen. Thus, an increase in the exchange rate of a currency expressed in direct quotation indicates that the value of the currency has fallen.

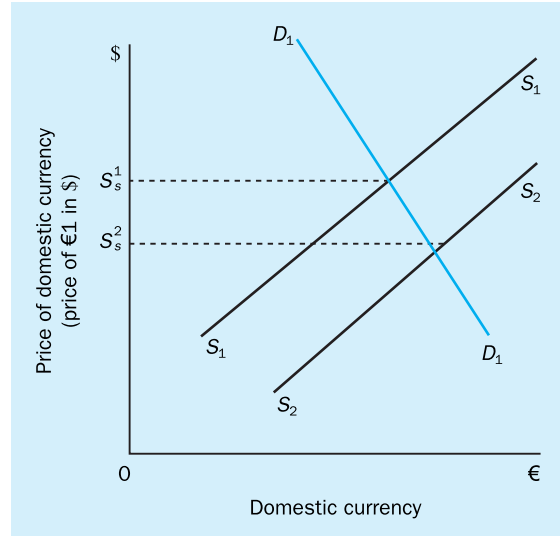
For British students in particular, there is a complication because the UK uses the **indirect quotation** (denoted by  $S_s$ ) of the exchange rate in which the price of the domestic currency is expressed. This asks how much foreign currency exchanges for one unit of the domestic currency (foreign currencies are quoted against the domestic currency):

What is the price of €1 in US dollars, sterling, yen, Swiss francs . . . ?

The answers are in the form:

$$\begin{aligned} \text{€1} &= \$1.2225; & \text{€1} &= \text{£}0.6811 \\ \text{€1} &= \text{¥}135.368; & \text{€1} &= \text{SFr}1.5666 \end{aligned}$$

This method conflicts with the normal idea of a price but it does have one advantage. The relevant diagram has the price of the domestic currency (euros) in foreign currency (US dollars) on the vertical axis and the quantity of the domestic currency demanded and supplied on the horizontal axis. Now, an increase in



**Figure 18.2** Supply and demand using indirect quotations

demand for dollars will be shown as an increase in the supply of euros in order to acquire the extra dollars. The supply curve for euros moves down (from  $S_1S_1$  to  $S_2S_2$ ) and the exchange rate falls (from  $S_s^1$  to  $S_s^2$ ) – meaning here that the value of euros also falls (see Figure 18.2). Thus, we can talk either of a fall in the value of the domestic currency or of a fall in its exchange rate.

Box 18.1 provides additional information on the expression of exchange rates and Exercise 18.1 gives you some practice in the manipulation of rates.

### Exercise 18.1

You are given the following indirect quotations of the dollar against the euro, sterling and the yen.

$$\begin{aligned} \$1 &= \text{€}0.7861 - 0.7870 \\ \$1 &= \text{£}0.541 - 0.5416 \\ \$1 &= \text{¥}105.1 - 105.8 \end{aligned}$$

- 1 Calculate the mid-points and the direct quotation of each of these rates.
- 2 Calculate the exchange cross rates between:
  - (a) the euro and the pound sterling;
  - (b) the pound sterling and the yen;
  - (c) the euro and the yen.

### 18.2.1 Spot and forward rates of exchange

As Table 18.1 showed about one third of foreign exchange transactions are **spot** transactions – purchases/sales of foreign currency for immediate delivery, which means that the transaction must be completed within two working days of the contract being made (the date of the actual payment of funds is called the value date). **Forward** rates of exchange relate to contracts entered into now for promised delivery in the future. The most common periods for forward contracts are one month and three months, although much longer periods are possible especially for heavily traded currencies.

**Box 18.1 Bid and offer rates of exchange**

Whether using direct or indirect quotation above, we have provided only one exchange rate in each case. This is, however, the mid-point between two exchange rates: the *bid rate* – the rate at which market makers are prepared to buy – and the *offer rate* – the rate at which they are prepared to sell. If we are using direct quotation, we are talking in terms of the buying and selling of the foreign currency and bid rates will be below offer rates in order to provide market makers with a profit. With indirect quotation, market makers are quoting the price of the home currency and bid rates will be above offer rates. For example:

*Direct quotation of sterling (sterling against the euro and the dollar)*

Bid rate: £0.6829 = €1	Offer rate: £0.6805 = €1	Mid-point: £0.6817 = €1
Bid rate: £0.5466 = \$1	Offer rate: £0.5410 = \$1	Mid-point: £0.5438 = \$1

*Indirect quotation of sterling (the euro and the dollar against sterling)*

Bid rate: £1 = €1.4643	Offer rate: £1 = €1.4695	Mid-point: £1 = €1.4669
Bid rate: £1 = \$1.8295	Offer rate: £1 = \$1.8484	Mid-point: £1 = \$1.8390

As well as providing a profit for market makers, the difference between the two rates (the *bid-offer* or *bid-ask* spread) covers their costs and reflects the degree of risk involved in holding the foreign currency in question. For example, there are many transactions every day between the euro and the US dollar (the market is very deep) and so there is little chance of sudden, large movements in the exchange rate. Consequently, the bid-offer spread is likely to be only a very small percentage. For less commonly traded currencies such as the New Zealand dollar, bid-offer spreads are likely to be larger. Spreads are often quoted in terms of *points* or *pips*, where a point is .0001 and a pip is .00001. Hence, the bid-offer spread where the rates are £0.6829 – £0.6805 = €1 is 24 points or 240 pips.

Table 18.4 shows an extract from the *Financial Times* table headed ‘Currency Rates’ on 21 February 2004. The table shows spot and forward rates of exchange for a range of currencies against the dollar, the euro and the pound. The first row in every case provides the spot rate of exchange. For some currencies, for example the Tunisian dinar and the Turkish lira, only the spot rate of exchange is given because market makers are not prepared to take the risk involved in quoting forward rates of exchange on those currencies.

You will note an oddity about the way in which rates are quoted in Table 18.4. If you look at the dollar column you see that most rates are indeed quoted ‘against the dollar’: \$1 = won167.30 = SKr7.3068 = SFR1.2550 = T\$33.1000 = Bt39.1700 and so on. However, when you arrive at the exchange rate for sterling, you find £1 = \$1.8698. That is, here we have the dollar quoted against the pound (the direct quotation of the dollar). We then return to the indirect quotation of the dollar: \$1 = Peso29.4150 = Bolivar3157.36 = Dong 15737.00.

However, for the euro, we are back to €1 = \$1.2572. The *Financial Times* tells you this in a footnote: ‘The other figures in the dollar column of both the Euro and Sterling rows are in the reciprocal form in line

with market convention.’ That is, the conventions of the London foreign exchange market. The quotations of the pound and the euro against the dollar are provided in brackets beside the name of each currency:


$$\$1 = \text{£}0.5348 \quad \text{and} \quad \$1 = \text{€}0.7954$$

For each exchange rate, we are given the ‘closing mid’, the mid-point between bid and offer rates of exchange at the close of the London exchange on the previous trading day, and the ‘day’s change’, the amount that the mid-point changed during the previous day’s trading. Thus we see that the mid-point between bid and offer rates for the South Korean won at the close of the London market on 20 February 2004 were:

$$\begin{aligned} \$1 &= \text{won}1167.3 & \text{€}1 &= \text{won}1467.47 \\ \text{£}1 &= \text{won}2182.62 \end{aligned}$$

We are also told that the rate against the US dollar changed by +2.80 during trading on 20 February. Thus, the rate at the close on 19 February must have been  $(1167.3 - 2.80) = 1164.5$ . That is, the won weakened against the dollar the previous day. Because exchange rates are being quoted indirectly, a plus sign here will indicate that a currency has weakened against the currency in the relevant column (the dollar, the euro

Table 18.4 Currency rates

		DOLLAR		EURO		POUND		
Currency		Closing mid	Day's change	Closing mid	Day's change	Closing mid	Day's change	
<b>South Korea</b>	(Won)	1167.30	+2.80	1467.47	-8.77	2182.62	-17.70	
One Month		1169.75	+3.10	1469.34	-8.43	2181.98	-17.19	
Three Month		1173.15	+2.80	1471.18	-8.81	2177.19	-17.58	
One Year		1189.85	+2.40	1483.76	-9.54	2157.62	-18.62	
<b>Sweden</b>	(SKr)	7.3068	+0.0602	9.1858	-0.0007	13.6623	-0.0301	
One Month		7.3155	+0.0602	9.1892	-0.0009	13.646	-0.0303	
Three Month		7.3323	+0.0601	9.1951	-0.0011	13.6077	-0.0299	
One Year		7.3953	+0.0607	9.2221	-0.0017	13.4103	-0.0318	
<b>Switzerland</b>	(SFr)	1.2550	+0.0110	1.5778	+0.0007	2.3468	-0.0038	
One Month		1.2542	+0.0110	1.5755	+0.0008	2.3397	-0.0039	
Three Month		1.2524	+0.0110	1.5708	+0.0009	2.3246	-0.0036	
One Year		1.2437	+0.0108	1.5510	+0.0006	2.2555	-0.0040	
<b>Taiwan</b>	(T\$)	33.1000	+0.0300	41.6117	-0.3112	61.8904	-0.5954	
One Month		33.0525	+0.0225	41.5178	-0.3206	61.654	-0.6087	
One Year		32.455	+0.0400	40.4718	-0.2924	58.8523	-0.5547	
<b>Thailand</b>	(Bt)	39.1700	-0.0100	49.2426	-0.4259	73.2401	-0.7905	
One Month		39.18	-0.0150	49.2147	-0.4327	73.0839	-0.8001	
One Year		39.265	-0.0100	48.9640	-0.4272	71.2013	-0.7780	
<b>Tunisia</b>	(Dinar)	1.2208	+0.0069	1.5348	-0.0041	2.2827	-0.0110	
<b>Turkey</b>	(Lira)	1333625	+2625	1676568	-10741	2493612	-21313	
<b>U A E</b>	(Dirham)	3.6731	+0.0001	4.6177	-0.0386	6.8680	-0.0721	
One Month		3.6732	-	4.6140	-0.0387	6.8519	-0.0721	
One Year		3.6756	+0.0001	4.5835	-0.0387	6.6652	-0.0709	
<b>UK (0.5348)</b>	(£)	1.8698	-0.0197	0.6724	+0.0015	-	-	
One Month		1.8653	-0.0197	0.6734	+0.0014	-	-	
Three Month		1.8558	-0.0195	0.6757	+0.0014	-	-	
One Year		1.8133	-0.0193	0.6877	+0.0015	-	-	
<b>Uruguay</b>	(Peso)	29.4150	-	36.9791	-0.3103	55.0002	-0.5795	
<b>USA</b>	(\$)	-	-	1.2572	-0.0105	1.8698	-0.0197	
One Month		-	-	1.2561	-0.0106	1.8653	-0.0197	
Three Month		-	-	1.2541	-0.0105	1.8558	-0.0195	
One Year		-	-	1.2470	-0.0106	1.8133	-0.0193	
<b>Venezuela</b>	(Bolivar)	3157.36	-	3969.27	-33.31	5903.62	-62.20	
<b>Vietnam</b>	(Dong)	15737.00	+14.00	19783.80	-148.20	29425.00	-283.60	
<b>Euro (0.7954)</b>	(Euro)	1.2572	-0.0105	-	-	1.4873	-0.0032	
One Month		1.2562	-0.0105	-	-	1.4849	-0.0033	
Three Month		1.2541	-0.0105	-	-	1.4799	-0.0030	
One Year		1.247	-0.0105	-	-	1.4541	-0.0032	
<b>SDR</b>	-	0.67140	-	0.84405	-0.0018	1.255400	-	

Source: *Financial Times*, 21 February 2004.

**Box 18.2 Official versus tourist rates of exchange**

There are two obvious differences between official and tourist exchange rates. Firstly, tourist rates are worse for both buyers from and sellers to the foreign exchange office – there is a much bigger spread between bid and offer rates. Secondly, foreign exchange offices often make commission charges as well as benefiting from the wider bid/offer spread. How can one explain this?

Remember that the spread (+ commission charges) covers costs and provides profits for dealers. Tourist transactions are on average small and administrative costs are likely to be high relative to turnover. This is particularly likely since exchange offices are usually centrally located in high property rental areas and, for the convenience of customers, keep generous hours and hold a wide range of currencies, some of which may have quite large risk associated with them. Part of the large spreads and charges can, then, be explained by the costs of providing the service.

In addition, however, there is certainly an element of what the market will bear. The principal forex markets are characterized by large numbers of operators and a high degree of knowledge of available rates. The considerable degree of competition forces profit margins down to very low levels, although market makers still do very well in absolute terms because of the size of the transactions.

There is a much lower level of consumer knowledge in tourist forex markets and a much smaller degree of competition among suppliers. By and large, tourists take the rate that they are offered, grumble about it though they may.

or the pound). You will see in Table 8.14 that the won weakened against the dollar on 19 February, but strengthened against both the euro and the pound, implying that the dollar had strengthened against both the euro and the pound. This can be confirmed by looking down the table to the rates for the dollar, where you will find a negative sign in the columns showing the change in the value of the dollar against the euro and the pound (−0.3103 and −0.5795, respectively).

Although the London foreign exchange market closes officially at 4 p.m., foreign exchange trading does not stop at that time. The market does not have a physical location. Trading takes place via computer link, telephone and telex among the major participants and thus can continue after 4 p.m. In addition, trading takes place on foreign exchange markets in other countries. The value of currencies goes on changing across the world in a number of major markets whose trading hours overlap. The three principal forex markets are London, New York and Tokyo but these markets do not cover the whole 24 hours and significant markets have developed elsewhere, notably in Los Angeles, Hong Kong, Singapore, Bahrain, Zurich, Frankfurt and Paris. When the London market opens the next day rates will have changed, perhaps considerably, from those quoted as the closing London

rates in the *Financial Times*. It is also worth noting that the exchange rates quoted on the ‘Currencies, Bonds and Interest Rates’ page of the *Financial Times* are rather different from the exchange rates available to tourists and other small users of foreign currencies. This issue is dealt with in Box 18.2.

Table 18.4 also gives rates for forward foreign exchange contracts involving the delivery of a foreign currency in one month, three months and one year’s time (although for less traded currencies such as the Taiwanese dollar and the Thai baht figures are provided for one month and one year ahead). Consider the *One month* details. The one-month rate for the euro against the pound is given as €1.4849, below the spot rate of €1.4873 – the exchange rate for pounds one month in advance was lower than the spot rate by €0.0024. In other words, against the pound the euro was trading at a **premium** of €0.0024. This can be expressed as an annual rate obtained by multiplying the one-month premium (€0.0024) by 12 to convert it into an annual figure, dividing by the spot exchange rate (€1.4873), and multiplying by 100 to produce a percentage rate:

$$\frac{(0.0024)12}{1.4873} \times 100 = 1.94\%^4 \quad (18.1)$$

<sup>4</sup> The calculation actually produces an answer of 1.9363 per cent, which has been rounded up to 1.94 per cent.

We could also calculate the annual percentage rates for the euro three-months forward against the pound, remembering to multiply the premium by 4, rather than by 12. Using the figures in Table 18.4 produces a figure of 1.99 per cent whereas 12 months forward, the premium was 2.23 per cent.

All of the currencies for which forward rates are shown in Table 18.4 were trading at a premium against the pound. However, on the same day, the Australian dollar was trading at a forward *discount* against sterling. The rates quoted in the *Financial Times* were:

spot: £1 = A\$2.4070; 1 month forward £1 = A\$2.4097 1 year forward £1 = A\$2.4388

We can calculate that, one month forward, the Australian dollar was at a forward discount to sterling of -1.35 per cent per annum (discounts are written with a negative sign). We shall look at why some currencies trade at a forward premium and others at a forward discount in Section 18.3.1. Exercise 18.2 provides some practice in the calculation of forward premiums and discounts.

### Exercise 18.2

You are given the following indirect quotations of the euro, sterling and the yen against the US dollar (that is, the value in each of the other currencies of \$1):

	EURO	POUND	YEN
<b>USA</b>			
Spot	0.7954	0.5348	108.855
One month	0.7961	0.5361	108.76
Three month	0.7974	0.5389	108.555
One year	0.8019	0.5515	107.395

- (a) Which two of the three currencies quoted here were trading at a forward discount against the US dollar?
- (b) Calculate the annual percentage rate of each of the following:
  - (i) the forward discount or premium of the yen against the dollar one month forward.
  - (ii) the forward discount or premium of the euro against the dollar three months forward.
  - (iii) the forward discount or premium of the pound against the dollar one year forward.

Another point which we shall explain in Section 18.3.1 can be observed by comparing the one-month, three-month and one-year premiums or discounts in the cases of the euro and the pound against the dollar. On 21 February 2004, the percentage per annum discount for the euro against the dollar falls the further ahead the market looks (from -1.0561 per cent for one month forward to -0.8172 per cent for one year forward). For the pound, however, the percentage discount rises (from -2.917 per cent for one month forward to -3.1223 per cent for one year forward).

From the information provided in Table 18.4, it is possible to calculate through the dollar, the exchange rate between any pair of the 14 non-dollar currencies listed. That is, it is possible to calculate the **exchange cross rate**, defined as an exchange rate calculated from two other rates, for instance the exchange rate of the euro against the Swedish krøna (SKr) derived from the \$/SKr and the \$/€ rates. It is possible also to calculate cross rates using the euro or the pound but, in practice, all cross rates are calculated through the US dollar. Indeed, the cross exchange rate is sometimes defined as the exchange rate between two non-dollar currencies calculated through the US dollar. Let us calculate the cross rate of Swedish krona against the dollar. To do this, we need to multiply the exchange rate of the Swedish krona against the dollar (the indirect quotation of the dollar) by the exchange rate of the dollar against the euro (the direct quotation of the dollar):

$$\text{SKr}/\$ \times \$/\text{€}$$

Happily, Table 18.4 gives us both figures. We have:

$$\$1 = \text{SKr}7.3068 \quad \text{and} \quad \text{€}1 = \$1.2572$$

These, remember, are the mid-points between the bid and offer rates of exchange.

Multiplying the two rates gives us €1 = SKr9.1861. We can see that this is very slightly different from the exchange rate given for the Swedish krona against the euro in the table (9.1858). This is almost certainly simply because we are using mid-points and this often involves doing some rounding up of numbers. However, from time to time exchange rates across currencies or in different markets do move out of line, providing opportunities for arbitrage.

As a second example, consider the cross rate between the Swedish krona and the Swiss franc. Assume this time that we want the rate for the Swiss franc against the Swedish krona. We can do this by: SFr/\$ × \$/SKr.

**Exercise 18.3**

Using the exchange rates provided in Table 18.4, calculate the following cross rates of exchange through the US dollar:

- (a) SKr against SFr;
- (b) Won against T\$;
- (c) Bolivar against SFr.

To find the exchange rate of the currency against other currencies (the direct quotation), find the currency across the top of the table and read down. In this way, we find from the Swiss franc (SFr) column that:

$$\begin{aligned} \text{SFr}0.946 &= \text{C\$}1; \text{SFr}2.087 = \text{DKr}10; \\ \text{SFr}1.554 &= \text{€}1; \text{SFr}1.176 = \text{¥}100; \\ \text{SFr}1.842 &= \text{Nkr}10; \text{SFr}1.686 = \text{SKr}10; \\ \text{SFr}2.320 &= \text{£}1 \text{ and } \text{SFr}1.256 = \text{\$}1. \end{aligned}$$

The table also allows us to find quickly the amount of a currency quoted in direct quotations – by glancing at the diagonal running from left to right.

Table 18.4 gives us  $\text{SFr}/\text{\$} = 1.2550$ . However, to obtain  $\text{\$/SKr}$ , we need to take the reciprocal of the rate provided for the dollar in the table, i.e.  $1/7.3068$ . This gives us:  $\text{SKr}1 = \text{\$}0.1369$  and our cross rate will be:  $\text{SFr}/\text{SKr} = 0.1718$ . That is,  $\text{SKr}1 = \text{SFr}0.1718$ . Exercise 18.3 gives some practice in calculating cross rates.

To make life easier, the *Financial Times* publishes a table of exchange cross rates involving nine currencies. The exchange cross rates table published on 23 March 2004 is reproduced here as Table 18.5.

By taking a currency in the left-hand column and reading across the table, we find the exchange rates of eight other currencies against that currency (the indirect quotation). We have, for example:

$$\begin{aligned} \text{€}1 &= \text{C\$}1.643 = \text{DKr}7.447 = \text{¥}132.2 = \text{Nkr}8.436 \\ &= \text{SKr}9.221 = \text{SFr}1.554 = \text{£}0.670 = \text{\$}1.238 \end{aligned}$$

**More from the web**  
**Exchange rates on the internet**

On the website of the *Financial Times* ([www.ft.com/markets/currencies](http://www.ft.com/markets/currencies)), click on ‘World currencies’ and you will find graphs showing recent movements in the pound, the euro and the yen against the US dollar. Below this is a currency converter allowing you to convert any one of 25 currencies against each of the others in either direct or indirect quotation. Finally, there is the World Currencies table giving you exchanges rates of the currencies used by over 200 countries against the dollar, the pound, the euro and the yen.

**Table 18.5** Exchange cross rates

Mar 22		C\$	DKr	€	¥	Nkr	SKr	SFr	£	\$ 
Canada	(C\$)	1	4.533	0.609	80.47	5.135	5.612	0.946	0.408	0.753
Denmark	(DKr)	2.206	10	1.343	177.5	11.33	12.38	2.087	0.900	1.662
Euro	(€)	1.643	7.447	1	132.2	8.436	9.221	1.554	0.670	1.238
Japan	(¥)	1.243	5.633	0.756	100	6.381	6.975	1.176	0.507	0.936
Norway	(Nkr)	1.948	8.828	1.185	156.7	10	10.93	1.842	0.794	1.467
Sweden	(SKr)	1.782	8.077	1.085	143.4	9.149	10	1.686	0.727	1.342
Switzerland	(SFr)	1.057	4.792	0.643	85.06	5.428	5.933	1	0.431	0.796
UK	(£)	2.452	11.12	1.493	197.3	12.59	13.76	2.320	1	1.847
USA	(\\$)	1.328	6.018	0.808	106.8	6.817	7.451	1.256	0.541	1

Danish Kroner, Norwegian Kroner and Swedish Kroner per 10; Yen per 100.

Source: Derived from WM Reuters.

Source: *Financial Times*, 23 March 2004.

## 18.2.2 Exchange rate indices and currency baskets

It may be useful to know what is happening to the value of a currency in general as well as to specific exchange rates. Since the pound might, for example, rise against the dollar but fall against the euro and the yen, exchange rate indices are prepared showing the average performance of a currency against a basket of other currencies. Because the pound's relationship with some currencies is much more important than with others from the point of view of the UK's overall trading position, an exchange rate index (the **effective exchange rate**) shows changes in the value of a currency against a *weighted average* of the values of a number of other currencies. Weights are based on the importance in trade of different currencies, taking into account competition in third markets. Thus, an exchange rate index for the pound would give a much higher weight to the euro than, for instance, to the Canadian dollar.

Effective exchange rate indices prepared by the Bank of England are provided for a range of currencies in the *Financial Times* in the column headed 'Effective Index Rates'. The table published on 20 April 2004 is reproduced here as Table 18.6. The figures beside each currency show what has happened to its average

**Table 18.6** Effective index rates

	Mar 22	Mar 19	Mth ago 
Australia	87.8	87.6	89.9
Canada	86.6	86.5	85.8
Denmark	106.5	106.6	106.9
Japan	136.9	137.2	134.4
New Zealand	103.6	102.7	106.3
Norway	95.5	95.0	91.9
Sweden	80.6	80.4	81.3
Switzerland	111.6	111.3	110.4
UK	105.3	104.9	105.5
USA	95.5	95.7	95.5
Euro	90.75	90.79	91.85

Source: Bank of England. Base average 1990 = 100. Index rebased 1/2/95. For further information about EERIs see [www.bankofengland.co.uk](http://www.bankofengland.co.uk).

Source: *Financial Times*, 23 March 2004.

value since 1990 (in each case the average value of the currency for 1990 = 100). Thus, we see that the Swiss franc has, since 1990, risen in value against a relevant basket of currencies by around 11 per cent while the yen has risen by 37 per cent. Among those currencies which have fallen in value are the Australian dollar, the Swedish krona and the Canadian dollar. The effective index of sterling has risen by around 5 per cent. In 1990, of course, the euro did not exist as a single currency and so its effective index is based on the average values of its component currencies in 1990.

The spot exchange rate we have dealt with so far is also known as the *nominal exchange rate*. A firm may become uncompetitive in foreign markets either because the value of its domestic currency has risen (causing the prices of its products expressed in foreign currencies to rise) or because the prices in domestic currency of its products have risen. Consequently, to judge the competitive position of a country's firms against those of another country, we must adjust the nominal exchange rate to reflect the differences between the inflation rates in the two countries. This gives us the **real exchange rate** between two currencies. The formula for calculating the real exchange rate depends on whether the nominal rate is quoted in indirect or direct terms. Assume an exchange rate of £1 = \$1.8093 (the indirect quotation of the pound sterling). Assume further that the UK's expected inflation rate over the next year is 2 per cent per annum as against 4 per cent for the USA. We might then calculate the real exchange rate of sterling as:

$$S_R = S_S + (\pi_D^e - \pi_F^e)S_S \quad (18.2)$$

where  $S_R$  and  $S_S$  are respectively the real and nominal exchange rates, both in indirect quotation, and  $\pi_D^e$  and  $\pi_F^e$  are the domestic (UK) and foreign (US) expected inflation rates respectively. Thus, the real exchange rate of sterling is:

$$£1 = \$1.8093 + (1.02 - 1.04)1.8093 = \$1.7731$$

The real exchange rate being below the nominal exchange rate indicates that British goods will in the future be more competitive (because of the lower expected inflation rate) than is suggested by the nominal rate. Expressing the exchange rate in direct form, we have £0.6934 = \$1 and the real exchange rate formula becomes:

$$E_R = E_S + (\pi_F^e - \pi_D^e)E_S \quad (18.3)$$

where  $E_R$  and  $E_S$  are respectively the real and nominal exchange rates, both in direct quotation. This gives:

$$\$1 = \pounds 0.5527 + (1.04 - 1.02)0.5527 = \pounds 0.5638$$

Now, the higher future competitiveness of UK goods is indicated by the real exchange rate being *above* the nominal rate.

Currency baskets have uses other than providing the basis for the calculation of exchange rate indices. An important basket in current use in the world economy is the Special Drawing Right (SDR). The SDR is a weighted average of four currencies (the US dollar, the yen, the euro and the pound sterling). Its value is given in Table 18.4  $\$1 = \text{SDR}0.6714$   $\text{€}1 = \text{SDR}0.84405$   $\text{£}1 = \text{SDR}1.2554$ . All IMF accounting is in SDRs; and SDRs were issued to countries in the 1970s and early 1980s to form part of the international reserves of IMF members.

#### More from the web

##### Sources of information about the SDR

For details of the history and use of the SDR go to [www.imf.org](http://www.imf.org). Click on 'IMF Finances' along the top and then 'Special Drawing Rights (SDRs)' under the heading General Information. For details of the calculation of the current value of the SDR and of the current interest rate, click on the headings 'SDR Interest Rate Calculation' and 'SDR Valuation' down the left-hand side of the IMF Finances page.

### 18.3 The efficient market hypothesis

We look in detail at the **efficient market hypothesis** (EMH) in Chapter 26 but we introduce it here in an informal way to help us to explain some of the relationships underlying trading in foreign exchange markets. In the context of financial markets, the degree of efficiency refers to two issues:

- 1 whether markets adjust to new conditions through changes in prices (flex-price markets) or changes in quantities (fix-price markets), with markets remaining out of a genuine market-clearing equilibrium for a considerable period of time; and
- 2 the speed with which flex-price markets move to new equilibrium positions.

A fully efficient market is a perfect market in which adjustment to a new equilibrium occurs instantaneously as soon as conditions that bear upon the market price change. Such a market must have a large number of independent profit-maximizing participants, none of whom is powerful enough to influence prices. All information relevant to the market price must become immediately available to all participants. It follows that only normal profits can be earned. Supernormal profits require the possession of some degree of monopoly power and/or of some privileged access to information – both of these we have ruled out by definition. Equally it follows that past changes in market prices have no influence on future prices. We begin in equilibrium. Future price changes derive solely from new information ('news') and this may equally be suggesting a fall or a rise in the price. In other words, new events influencing the market are random. A corollary of the EMH is that no one can outguess the market and so there is no scope for speculation.

But what information is relevant? The implication of the EMH is that everyone has access to the best model – in our case of the determination of exchange rates – and derives from this model an understanding of the relevance of news. There is no particular view as to the nature of this model other than that it is the best one available, in the sense that it provides a better explanation of exchange rates than do all other existing models. The best model might be a model embodying market fundamentals above. However, it might also contain other economic news and/or news about political events or institutional changes. As we shall see when we discuss the views of chartists, the best available model might not include market fundamentals at all.

If foreign exchange markets were *fully* efficient, spot and forward exchange rates would adjust immediately to any new information received and the existing forward rates would be a good predictor of future spot rates of exchange. This is because someone needing foreign currency in three months' time could either buy it now three months forward at the existing forward rate or could wait and buy it in three months' time at the spot rate of exchange then ruling. In a perfectly informed market, the cost of these two actions must be equal. If they were not equal, a profitable arbitrage opportunity would exist and the actions of arbitrageurs would bring the two rates into equality. In practice, the forward rate is not a perfect predictor of the future spot rate. As well as



transaction costs, information is neither perfect nor free. Thus, there are costs and benefits associated with acquiring additional information and at some point the costs of doing so outweigh the gains from being able to make an even better forecast of the future spot rate of exchange. Further, some uncertainty attaches to the future spot rate of exchange and so we would expect the forward rate to differ from the future spot rate to allow for a *risk premium*.

It is possible to accept this, but to adopt a weaker version of EMH, for example that forward rates better predict future spot rates than do other theories of exchange rate determination. This does not require the belief that everyone in the market acts rationally on the basis of correct information since the actions of speculators must be taken into account. Speculators might bet on the relationship between, say, the three-month forward rate and the actual spot exchange rate in three months' time. If the forward rate does not on average equal the future spot rate, speculators are missing profit opportunities. For example, if the forward price of the euro is typically less than the spot rate when the forward contract matures, one could regularly buy the euro forward, re-sell it spot and make a net profit. It follows that all one needs to assume is that speculators are abundant and well informed and dominate the forward market. In this case, speculation is said to be *stabilizing* – it pushes the exchange rate back towards its equilibrium rate – and performs the same role as arbitrage does in a case where no risk is involved.

Any reading of actual market reports quickly makes it clear how difficult it is, in practice, to interpret news and to decide what information is relevant to the determination of the exchange rate. It is common, for instance, for a market to adjust to 'news' but then to go through a process of reinterpretation, sometimes drawing different inferences from it, other times discarding it altogether as irrelevant. Again, different sets of economic indicators often provide apparently conflicting information about the state of different aspects of the economy and hence of exchange rate fundamentals. There is always a degree of uncertainty as to what is genuine news and what is not. Some examples of these difficulties are provided in Box 18.3.

It is hardly surprising that there are difficulties in interpreting news since perfect models of the determinants of prices in any market do not exist. Particular problems with the impact of news arise when market participants are using different models or are

switching from one model to another. Information that is irrelevant to market price and that succeeds in confusing market participants is called noise, since it interferes with 'price signals'. One relatively small modification of market efficiency involves the acknowledgement of noise and of short-run disequilibrium in the market but the continued belief in long-run equilibrium. However, in financial markets in which there are many participants and information is rapidly transmitted with the use of modern technology, the period of disequilibrium is often held to be very short. We have seen that the period may be shortened further by the operation of arbitrageurs and speculators. Let us consider next the role of arbitrage in the relationship between forward and future spot rates of exchange. To do this, we must develop a number of important relationships among interest rates, exchange rates and rates of inflation.

### 18.3.1 Interest rate parity

We have seen that forward foreign exchange rates are quoted as being at either a premium or discount to the spot exchange rate. To begin to examine why some currencies are at a forward discount and others at a forward premium, consider the position of three investors *A*, *B* and *C*, each of whom has €1m to invest in a secure form for three months. *A* buys Italian government securities at existing euro interest rates. *B* sells the euro for sterling and uses it to buy British government securities that bear a higher interest rate than Italian securities. Suppose, however, that over the three months, the value of sterling falls relative to that of the euro. Then, when *B* comes to reconvert the pounds into euro, he may have incurred a loss – the higher interest rate on British securities may have been more than offset by the decline in the value of the UK currency. An operation of this kind is known as **uncovered interest rate arbitrage** – it is *interest rate arbitrage* because it seeks to take advantage of interest rate differentials; it is uncovered because the investor is not protected against exchange rate risk.

*C* takes advantage of the existence of the forward exchange market to obtain cover against this risk. Thus, at the same time that s/he buys British government securities, *C* sells three months forward the amount of sterling that s/he will receive in three months' time. In this way, s/he locks in the existing forward exchange rate. Then, when the British securities mature, *C* simply

**Box 18.3 The market interpretation of news**

The following passage is taken from the article ‘Strong employment data boost greenback’ by Steve Johnson on page M19 of the *Financial Times*, 8/9 May 2004.

‘The US dollar leapt higher on Friday following an unexpectedly bullish monthly jobs report. Non-farm payrolls jumped by 288,000 in April, way ahead of the 173,000 consensus expectation . . .

‘The futures market moved to price in a June Federal Reserve interest rate hike, aiding the dollar, which jumped to \$1.1893 against the euro, from \$1.2070 prior to the announcement, and an eight-month high of ¥112.20 against the yen . . .

‘After last month’s payrolls data appeared to be leaked two minutes early, currency and bond markets again spiked before Friday’s announcement – but in the wrong direction. Traders attributed this to either a false rumour or a large trade conducted amid poor liquidity.’

**Comment**

Information on the state of the US economy was expected during the day in the form of non-farm payroll statistics for the previous month. These give the number of people in work in the economy excluding agriculture. The number of people in work had been rising over the previous seven months as the economy recovered from recession. The figures were again expected to show an improvement. The speed of the recovery was thought likely to influence the interest rate decisions of the Federal Reserve in the coming months.

The previous month the data on payrolls had been leaked two minutes before the official release time, leading to a sharp change in prices in currency and bond markets. This time there were again early rumours about the figures, causing a sharp fall in the value of the dollar (the dollar ‘spiked’ in the wrong direction). When the official figures were released, they showed the number of jobs had increased by many more than the market had predicted, encouraging optimistic (bullish) views of the state of the economy. Now, the dollar rose in value. It seems that the rumours causing the dollar to move in the wrong direction were false.

The major reason for the rise in the dollar was the expectation that the Fed would increase interest rates in June because the speed of the US recovery might be suggesting worries about inflation over the following two years. The article also suggests another possible reason for the early movement of the dollar in the wrong direction – a single large sale of dollars in a period when little trading was going on (poor liquidity). Most traders would have been awaiting the release of the official figures. Few would have been willing to buy in advance of this and so a large sale would have had a big impact on the price.

The article shows the importance of expectations regarding the state of the economy and the actions of the authorities as well as problems arising from rumours and the state of the market.

fulfils the forward contract and finishes up back in euro. S/he has engaged in **covered interest arbitrage**, having taken no risk in the process. Clearly, the actions of A and C are directly comparable and, in a well-informed market, the rates of return available to A and C quickly move to equality. A’s rate of return is the interest rate on three-month Italian government securities. C’s rate of return consists of two elements:

- 1 the interest rate on three-month British government securities;
- 2 the forward exchange premium or discount involved in selling sterling forward.

Assume next that, at the beginning of the three-month period, the euro and sterling were trading with no forward premium or discount (spot and forward rates

were exactly the same) but that British interest rates were higher than euro interest rates for comparable securities. Clearly, then, C’s investment strategy would be better than A’s and large numbers of investors would follow C. In other words, they would:

- (a) sell Italian securities (forcing their price down and pushing the yield on them up);
- (b) buy sterling spot (forcing up the spot exchange rate of the pound – increasing the number of euro needed to buy £1);
- (c) buy British securities (forcing their price up and yields on them down); and
- (d) cover their exchange rate risk by selling sterling three months forward (forcing down the three-month forward exchange rate of sterling).

This process would continue until the rates of return available on the strategies of A and C came into equality (with some small allowance for the transactions costs involved), establishing **covered interest parity**. What is the final outcome? Euro interest rates start below sterling rates, but euro interest rates rise while sterling rates fall. Thus, the interest rate differential between the two currencies is reduced. The spot exchange rate of the pound rises while the forward rate falls, opening up a difference between the two (forward, the pound trades at a discount). The arbitrage opportunity remains until the interest rate differential between the two currencies equals the forward discount on the pound (again, allowing for transactions costs). This establishes a general rule:

The currency of the country in which interest rates are higher trades at a forward discount; the currency of the country with the lower interest rates trades at a forward premium.

We can go further. If there are no opportunities for profitable arbitrage (there is covered interest parity) and there are no transaction costs, then the differential between the two interest rates (known as the **interest agio**) should equal the forward discount on the currency of the high interest rate country (the **exchange agio**). We can express the exchange agio for euro/sterling in terms of the direct quotation of the euro (the domestic currency) against the pound (the foreign currency).

$$\frac{i_D - i_F}{1 + i_F} = \frac{E_F - E_S}{E_S} = \frac{E_F}{E_S} - 1 \quad (18.4)$$

where  $i_D$  and  $i_F$  are the interest rates in the domestic (euro) and foreign (UK) currencies respectively;  $E_S$  and  $E_F$  are the spot and forward rates of exchange (expressed in direct quotation). It follows then that:

$$E_F = \left[ 1 + \left( \frac{i_D - i_F}{1 + i_F} \right) \right] E_S \quad (18.5)$$

Consider an example. In the *Financial Times* of 8/9 May 2004, the one-year interest rate on the pound was quoted as 4.895 per cent (0.04895); that on the euro as 2.276 per cent (0.02276). Thus, the difference between the two rates was 2.619 per cent (0.02619) or 262 basis points. The spot rate of exchange of the euro in direct quotation was  $\text{€}1.4997 = \text{£}1$ . We should then have had:

$$\begin{aligned} E_F &= \left[ 1 + \left( \frac{0.02276 - 0.04895}{1.04895} \right) \right] \times 1.4997 \\ &= 1.4623 \end{aligned} \quad (18.6)$$

That is, the one-year forward rate of sterling should have been  $\text{£}1 = \text{€}1.4623$ , with the euro at a one-year forward premium of  $= \text{€}0.0372$  per  $\text{£}$ .

To express exchange rates in indirect quotation and still have our signs correct, we must change the formula to:

$$\frac{i_D - i_F}{1 + i_F} = \frac{S_S - S_F}{S_F} \quad (18.7)$$

and:

$$S_F = \left[ \frac{1}{1 + \frac{i_D - i_F}{1 + i_F}} \right] S_S \quad (18.8)$$

The indirect quotation of the euro against sterling on the day in question was  $\text{€}1 = \text{£}0.6668$ . The forward discount should have been  $\text{£}0.0171$  and the forward exchange rate  $\text{€}1 = \text{£}0.6839$ . For ease of expression, we have been dealing here with a 12-month period. To calculate the expected three-month or one-month forward rate we must divide the annual interest rate differential by four or 12. Thus, the one-month interest rates on the euro and sterling at the close of the markets on 7 May 2004 were 2.0545 and 4.3900 respectively. The interest rate differential was 2.3355 per cent (or 234 basis points) but these were per annum rates. Our formula gives us an annual forward discount for sterling of  $\text{€}0.03355$ . To obtain the forward discount for one month we divide this by 12, giving a one-month forward discount of  $\text{€}0.0028$  and a one-month forward exchange rate of  $\text{£}1 = \text{€}1.4969$ .

Because of transaction costs, we would not have expected our estimate to be perfectly correct, but a glance at the real figures shows that we come very close to the actual figures. On the day in question we have:

*one month:*

Actual  $\text{£}1 = \text{€}1.4968$  or  $\text{€}1 = \text{£}0.6668$   
(sterling forward discount 2.3 per cent p.a.)

Estimate  $\text{£}1 = \text{€}1.4969$  or  $\text{€}1 = \text{£}0.6668$   
(sterling forward discount 2.24 per cent p.a.)

*one year:*

Actual  $\text{£}1 = \text{€}1.463$  or  $\text{€}1 = \text{£}0.6835$   
(sterling forward discount 2.45 per cent p.a.)

Estimate  $\text{£}1 = \text{€}1.4623$  or  $\text{€}1 = \text{£}0.6839$   
(sterling forward discount 2.49 per cent p.a.)

We would not always expect a calculation using the above formulae to produce results so close to the actual market figures. This is because in our calculations, we have been making a number of assumptions quite apart from the absence of transactions costs. The interest rates we used were taken from the ‘Market Rates’ table in the *Financial Times*. These were not the precise interest rates payable on Italian and UK government securities respectively. In the Italian/UK case the interest rate differential may have been quite close to the interest rate differential on government securities but this would not be true where the markets judged there to be a greater risk of default associated with one country’s government securities. This indeed was the position before the formation of the euro with Italian government securities issued in lira. The risk premium on Italian government securities included two elements – exchange rate risk to cover the possibility of a fall in the value of the lira and default risk based on the view of the international credit rating agencies that Italian government debt was too high. With Italy now in the eurozone, the risk of the lira falling in value relative to other eurozone currencies has disappeared but Italian government securities still carry slightly higher interest rates than, say, German government securities to cover the extra possibility of default.

The closeness of our estimates to the actual figures is, however, a good indication that covered interest rate parity does hold in foreign exchange markets.

**18.3.2 Differences in interest rates among countries – the Fisher effect**

We have established a relationship between spot and forward exchange rates. Several other questions follow, some of which we have already begun to consider.

- 1 Why do interest rates differ among countries?
- 2 What determines the existing spot rates of exchange?
- 3 What causes spot rates of exchange to change over time?

In fully efficient markets, each of these may also be answered by a rule based upon arbitrage operations. Nominal rates of interest consist of two elements:

- 1 the real rate of interest; and
- 2 the expected rate of inflation:

$$r \approx i - \pi^e \tag{9.15}$$

It follows that differences in expected inflation rates provide one cause of differences in international interest rates.

But what about real rates of interest? Ignoring the issue of exchange rate risk, and assuming perfect markets with perfect capital mobility and perfect information, theory tells us that capital should move from capital-rich countries in which the real rate of return on capital is low to capital-scarce countries with high real rates of return on capital and that this movement should continue until real rates of interest are equal across countries. This would be ensured by uncovered interest arbitrage. In practice, neither information nor international capital mobility is perfect and we have already noted the existence of default risk, exchange rate risk, and political or sovereign risk which require interest rates of many countries to include risk premiums if they are to attract capital. Indeed, private capital barely flows at all to the poorest countries despite the existence of very high rates of interest. Nonetheless, we can say that if all the necessary assumptions did hold, and real rates of interest were equal across countries, international interest rates would differ only because of:

- 1 expected exchange rate changes;
- 2 differences in expected rates of inflation among countries.

We could use this (the Fisher effect) to help us explain the differences in interest rates on the euro and sterling noted above. We could say that, with real interest rates equal across countries and the foreign exchange market in equilibrium, the difference in nominal interest rates on euro and sterling depends on the difference between the expected inflation rates in the eurozone and the UK. Treating Italy as the domestic country (*D*) and the UK as the foreign country (*F*), we could write:

$$\frac{i_D - i_F}{1 + i_F} = \frac{\pi_D^e - \pi_F^e}{1 + \pi_F^e} \tag{18.9}$$

This is sometimes known as the **Fisher closed hypothesis**.

**18.3.3 The determinants of spot exchange rates – purchasing power parity**

In the unlikely case that real interest rates were equal across all countries and that differences in nominal rates simply reflected differences in expected inflation

rates, then in equilibrium there would be no movements of capital internationally. The balance of payments balance would depend solely on the export and import of goods and services. Ignoring differences in product quality and continuing to assume perfect information, we could reach the position in which the only reason for preferring foreign goods to domestically produced goods or vice versa and hence the only cause of flows of currency from one country to another would be differences in price.

If, at the existing exchange rate, goods were cheaper in the USA than in the UK, UK citizens would switch to US-produced goods. To do this they would sell sterling and acquire dollars, forcing down the value of the pound relative to the dollar. This process of *goods arbitrage* would continue until prices in the two countries expressed in a common currency were equal. This is the essence of **purchasing power parity (PPP)**. In this form – absolute PPP – spot exchange rates in equilibrium are a reflection of differences in price levels in different countries. Since we are generally interested not in absolute exchange rates but rather in changes from existing rates, PPP is usually expressed in relative terms: that changes in spot exchange rates reflect differences in inflation rates among countries. Using the direct quotation ( $E$ ) of the exchange rate, this can be written:

$$\frac{\pi_D^e - \pi_F^e}{1 + \pi_F^e} = \frac{E_{t+1}^e - E_S}{E_S} \quad (18.10)$$

where  $\hat{P}_D^e$  is the expected inflation rate in the domestic country (UK),  $\hat{P}_F^e$  the expected inflation rate in the foreign country (USA),  $E_{t+1}^e$  the expected future spot rate of exchange at time  $t + 1$  and  $E_S$  the spot rate of exchange at time  $t$ . Assuming expected inflation rates in the UK of 2 per cent per annum and in the USA of 1 per cent per annum and a spot exchange rate £0.5599 = \$1 would give an expected exchange rate in one year's time on the basis of relative purchasing power parity of £0.5654 = \$1. In other words, the dollar would need to be stronger in one year's time if UK goods were to maintain PPP, given the higher inflation rate in the UK. The formula for the same calculation in indirect quotation is:

$$\frac{\pi_D^e - \pi_F^e}{1 + \pi_F^e} = \frac{S_S - S_{t+1}^e}{S_{t+1}^e} \quad (18.11)$$

Using a spot rate of exchange of £1 = \$1.7861, we obtain a future spot rate of exchange of £1 = \$1.7686.

### 18.3.4 The determinants of spot exchange rates – putting the relationships together

Notice that we have now proposed that differences in expected inflation rates are equal to *both* the expected change in spot exchange rates (PPP) and the difference in interest rates (the Fisher closed effect). It follows that in equilibrium, differences in interest rates must equal the expected changes in the spot rates of exchange. This equality is sometimes known as the international Fisher effect or the **Fisher open hypothesis** and, from Equations 18.9, 18.10 and 18.11, we may write:

$$\frac{E_{t+1}^e - E_S}{E_S} = \frac{i_D - i_F}{1 + i_F} = \frac{S_S - S_{t+1}^e}{S_{t+1}^e} \quad (18.12)$$

It can be seen that, maintaining our assumption of perfect markets, we have established a relationship between the forward rate of exchange (which is known in the present) and the future spot rate of exchange which is unknown. Covered interest parity establishes, remember, a link between interest rate differentials and forward premiums/discounts. But the combination of purchasing power parity and the Fisher effect establishes a link between interest rate differentials and expected changes in the exchange rate. It follows that if people behave rationally and are perfectly informed and all the other assumptions of perfect markets hold, forward rates of exchange accurately predict movements in spot rates of exchange. We can see this by comparing Equations 18.4 and 18.7 with 18.12. This makes it clear that the interest rate differential is equal to *both* the forward exchange rate premium or discount (as expressed against the foreign currency in Equation 18.4 and against the home currency in Equation 18.7) *and* the difference between the future spot and the existing spot exchange rates (shown both against the foreign currency and against the home currency in Equation 18.12).

Of course, we cannot (even with all of the assumptions above) claim that forward rates of exchange predict future spot rates perfectly accurately. After all, news may come to the market which takes all market participants by surprise. Nonetheless, since only genuinely random events should take well-informed market participants by surprise, we might still hope that forward rates of exchange would be *unbiased* predictors of the future spot rate. That is, forward premiums/discounts would not always forecast accurately future exchange rate changes but we might expect any errors

to cancel out over time and the predictions to be correct on average. However, the notion of the forward rate of exchange being an unbiased predictor of the future spot rate implies that speculators are risk neutral. If speculators are risk averse, the forward rate must be a biased predictor – the future spot rate will not equal the forward rate because speculators demand a risk premium to allow for the risk associated with assuming an uncovered position in the market. In fact, of the relationships we have developed above, only covered interest rate parity performs well in empirical testing.

### 18.4 Exchange rate arbitrage

The interest rate parity theorem considered in Section 18.3.1 provided an example of interest rate arbitrage. **Exchange rate arbitrage** involves taking advantage of differentials in the price of a currency in different markets. Such arbitrage transactions may be classified in terms of the number of markets involved. Thus we may have transactions in two markets (two-point arbitrage), three markets (three-point arbitrage) or more. Two-point arbitrage operations are very simple, taking advantage of small variations in the one exchange rate in two markets. For example, if the spot exchange rate of the euro were  $\text{€}1.50 = \text{£}1$  in London and  $\text{€}1.52 = \text{£}1$  in Frankfurt, arbitrageurs could profit from the differential by buying euros in Frankfurt and selling them immediately in London, forcing up the demand for euros in Frankfurt, and causing the rate there to fall below  $\text{€}1.52 = \text{£}1$ ; and increasing the demand for sterling in London, pushing the London rate above  $\text{€}1.50 = \text{£}1$ . The arbitrage operation would close the gap between the two rates. As always, the rates would not come exactly into line because of the existence of transactions costs, but the rates should move to being transactions-costs close – sufficiently close to remove any possible arbitrage profits.

Three-point arbitrage occurs where exchange rates among different currencies are mutually inconsistent. Arbitrageurs then attempt to profit from these inconsistencies and in the process eliminate discrepancies and establish mutually consistent exchange cross rates. Assume that the following three market rates applied in the Frankfurt market:

$$\begin{aligned} \$1 &= \text{SKr}7.3068 \\ \text{€}1 &= \$1.2572 \\ \text{€}1 &= \text{SKr}9.4541 \end{aligned}$$

We wish to consider the possibility that these rates are mutually inconsistent. Our first step is to take any pair of these market rates and use them to calculate the exchange cross rates consistent with them. We have already carried out this exercise for the first two rates in Section 18.2.1. There we discovered that the exchange cross rate for SKRs against the euro was:

$$\text{€}1 = \text{SKr}9.1861$$

Thus, it is clear that the market price ( $\text{€}1 = \text{SKr}9.4541$ ), *relative to the other pair of exchange rates*, is overvaluing the euro in terms of the SKr (the SKr is undervalued against the €). In other words, the three market rates are mutually inconsistent and a profitable arbitrage opportunity exists. We could have arrived at the same conclusion by using the  $\$/\text{€}$  and  $\text{SKr}/\text{€}$  rates to calculate the cross rate for Swedish krona against the dollar or by using the  $\text{SKr}/\text{\$}$  and the  $\text{SKr}/\text{€}$  rates to calculate the cross rate for the dollar against the euro.

To realize an arbitrage profit, it is necessary to follow two rules:

- 1 buy cheap and sell dear;
- 2 finish in the currency in which you started.

Assume we hold dollars. Our aim must be to organize our transaction to make sure that at some point we sell euros for SKRs, in order to take advantage of the inconsistency we discovered by calculating the cross rate (if we buy € with SKRs, we shall make a loss). In order to be able to do this, we must take the following steps:

- Step A:* Sell \$ for €; *Step B:* sell € for SKr;  
*Step C:* sell SKr for \$.

Make sure you understand each of these steps. In Step A, since the direct form of the exchange rate for the dollar is given (dollar against the euro), you will need to divide by the rate. However, for Step B, you are given the indirect rate for the euro (SKr against the euro) and you will need to multiply. What form of the exchange rate are you given for Step C?

You should calculate the arbitrage profit on the assumption that you start with \$1m. If you do not finish up with a profit of slightly over 2.9 per cent, try it again. Exercise 18.4 provides another example for you to try. In practice, the calculation would be a little more difficult than is suggested here because you would be faced with bid and offer rates for each exchange rate and you would need to choose the correct rate of the pair, depending on whether you were buying or selling.

**Exercise 18.4**

1. Imagine you are a German arbitrageur in the following example:

**Actual exchange rates**

$$€1 = \$1.1909$$

$$\$1 = ¥111.935$$

$$€1 = ¥135.303$$

Start with €1,000,000

- (a) List the steps you need to take to make a profit;
  - (b) Calculate the percentage rate of profit you would make (assuming no transactions costs)
2. Check your answer by using the same figures but starting and finishing in yen.

Three things should be noted here. Firstly, the profit may seem small relative to the capital. However, this profit may be made in moments and the arbitrageur bears no risk of loss. S/he undertakes the above steps simultaneously and starts and finishes in the same currency.

Secondly, step A causes the price of the dollar in terms of the euro to rise above 1.2572; step B, the price of the euro to fall below SKr9.4541; and step C, the price of dollars to rise above SKr7.3068. These changes continue until any possibility of profit from arbitrage is removed.

Thirdly, the same steps apply if we start and finish in a different currency from pounds, but the order of the steps is different. A Swedish arbitrageur starting and finishing in SKr would:

*Step A:* Sell SKr for \$ ; *Step B:* Sell \$ for €;

*Step C:* Sell € for SKr.

## 18.5 Foreign exchange risk and speculation

We have talked about the existence of foreign exchange risk. A market agent bearing risk is said to have an *open position in the market*. There are two types of open position – an agent may go *long* (take a **long position**) by having assets in a currency greater than his or her liabilities in the same currency. The risk then

is that the currency will weaken, reducing the value of the position. An agent who goes *short* (takes a **short position**) has liabilities in a currency greater than assets. The risk is that the currency will strengthen, increasing the debt in that currency. The act of moving from an open position to a closed position in the market (that is, covering exchange rate risk) is known as **hedging**. Consider hedging more formally.

Consider the case of a German firm that expects to receive Danish krona (DKr)100,000 in three months' time. The anticipated sum is worth €13,438 at a current spot exchange rate of €1 = DKr7.4416, but should the Danish krona depreciate to, say €1 = DKr8 before the end of this period, the German firm receives only €12,500 and incurs a foreign exchange loss. If, however, it had initially contracted to sell Danish krona forward at the market rate of €1 = DKr7.45, it would have received €13,423 and the loss would have been limited to €15. The existence of a long position (net foreign currency asset) and the failure to cover (hedge) this position exposed the German firm to an unfavourable and avoidable movement in the Danish krona spot exchange rate.

Take next the case of an Irish firm which must pay ¥1million in three months' time for goods from Japan. At a present spot exchange rate of €1 = ¥133.3, this would cost €7,502. If, however, the yen were to strengthen against the euro to, say, €1 = ¥125 over the period, the firm would find itself paying €8,000 and would suffer a foreign exchange loss of €498. This might be avoided by hedging through the forward exchange market: buying yen forward at a rate of, say, €1 = €132.5. In this case, the loss would have been limited to €45, the cost of the forward transaction.

How else might these firms cover themselves against foreign exchange risk? In our second example, it would have been possible to pay three months ahead, that is, to *lead* the payment. The loss in this case would have been the loss of interest on €7,502 for three months. Someone with a bill due now in a foreign currency which they feel will fall in value in the future may endeavour to pay late (to *lag* the payment). Again, foreign exchange risk can be covered using only the spot market. Thus, the Irish firm could buy yen in the spot market, invest them in Japanese securities for three months at Japanese interest rates and then use the yen at the end of the period to pay for the goods supplied. The German firm could borrow DKr at the beginning of the period, convert them into euro at the spot exchange rate and use the DKr

received in three months' time to pay off the loan. The cost of this operation would have been the interest paid on the DKr loan.

The forward market, however, provides a more convenient way of hedging. In the German example, it would have been necessary to find someone in Denmark willing to lend at reasonable interest rates. In the Irish case, either of the alternatives requires the firm to have funds now and to tie those funds up for three months. Other instruments useful for the hedging of risk, notably futures, options and swaps, are dealt with in Chapters 19 and 20.

Although the forward market was developed as a means of providing insurance against risk, it has come to be used principally as a means of **speculation**, which involves the taking on of risk (moving to an open position). Firms sometimes engage in speculation in an attempt to make additional profits to those produced by their normal activities. For example, the German firm may choose not to hedge against the exchange rate risk in the expectation that the currency in which it is long (the Danish Krona) will strengthen, increasing the return on the transaction. Equally, the Irish firm may choose not to insure itself against forex risk in the hope that the yen will weaken against the euro, allowing the firm to settle its bill at a lower cost in euros.

As well, a market agent may engage in speculation in a currency in which s/he has no other interest and may do this on either the spot or forward market. Most obviously, if a French speculator thinks that a currency, say the dollar, is likely to strengthen against the euro, s/he may borrow funds in euro and use them to buy dollars spot, hold the dollars in the form of a liquid security and, if the dollar strengthens, cash in the security, reconvert the dollars to euro, and pay off the loan, leaving a profit. Alternatively, s/he may use the forward market, selling euro for dollars forward. Then, when the dollar strengthens, s/he buys euro for dollars at the new spot rate and sells euro to meet the requirement of the forward contract. This would again leave the agent with a profit. Of course, if the value of the dollar fell rather than rose, both strategies would produce losses. The use of the forward market does not require the speculator to have available or borrow the full amount of the transaction at the beginning of the period, although s/he will need to have sufficient funds available to persuade the market-maker that s/he will be able to meet the forward contract when it falls due. Thus it is

likely that acting through the forward market requires some of the funds needed for the transaction to be tied up for a shorter period than does acting through the spot market. This, in turn, means that the per annum rate of profit from a forward transaction is likely to be higher than for the equivalent spot market transaction.

You should next consider how a speculator might make use of the forward market to profit from a belief that his or her home currency, say the euro, is likely to fall in value in the next month.

### 18.5.1 Attitudes to speculation

Speculators provide liquidity to a market. Thus, it is argued, their presence provides a benefit for agents who wish to use the market for normal business or insurance services. For example, in the absence of the activities of speculators, the number of people wishing to buy or sell a relatively minor currency forward may be so small that no market-maker is prepared to offer forward contracts involving that currency. Again, if only a small number of a particular forward contract (involving, say, US dollars and Australian dollars) were sold, the risks to the market maker would be high and the bid/offer spread on the contract would be large. Thus, firms wishing to hedge against risks associated with holding Australian dollars would find it expensive to do so. The presence of speculators deepens the market, reduces the volatility of the exchange rates and leads to a lowering of the cost of using the market.

In addition, as we have already seen, it is claimed that speculators act to ensure the efficient operation of markets, linking present and future prices of assets. This favourable view holds speculation to be stabilizing, always moving the market towards its equilibrium. Destabilizing speculators – those trying to bet against the natural direction of the market – would, it is argued, lose since market forces are so strong that it is not possible to act against them. For example, suppose market forces determine that the value of a currency must fall. Speculators make their profit by seeing this in advance of other people and selling the currency with the aim of buying it back later at a lower price. Thus their action forces the value down towards its new equilibrium value. Again, speculators who realize that a rise/fall from an equilibrium is likely to be only temporary act on the



correct assumption that the exchange rate returns to its previous level after the effects of the temporary shock wear off. They sell/buy the currency when it has deviated sufficiently from its equilibrium value for the return to equilibrium to compensate them for the trouble and risk of engaging in the transaction. In doing this, they help to push the currency back to the original equilibrium position. Successful speculators thus are said to ensure that movements to new equilibrium positions occur more smoothly than otherwise would be the case and that equilibrium positions are stable. Since the aim of speculation is to make a profit, it follows that unsuccessful speculators quickly leave the market. Only successful speculators remain in the market. This support for speculation is an important part of the argument that markets left to themselves produce stable equilibrium exchange rates and thus is a major element in the case for floating rates of exchange.

Arguments against speculation claim that some speculators do lose – they are not the core of professionals in the market but a part of the large fringe of traders, tourists and central banks that take open positions in foreign exchange but to whom the activity is peripheral. If this is so, it does not follow that the outcome of speculation is always to move the market in the direction in which it would otherwise have gone.

Of greater weight is the proposition that markets do not always work well and that this allows the possibility of profitable destabilizing speculation. Markets might, for example, fail because of time lags, different speeds of adjustment of different prices, lack of information or asymmetric information. In such circumstances, speculators might attempt to amplify price movements. This is more likely where trading volumes are low (thin markets) and market agents form expectations extrapolatively. For instance, speculators might be able to sell a currency sufficiently heavily to force its value down; others within the market observe the fall and assume it will continue. Thus, they also sell, pushing the price down further still. Speculators are then able to buy back in at the lower price, taking their profit.

We have also seen, the suggestion that even speculators may be risk averse, limiting the amount they bet on any economic outcome that is less than a sure thing. In such a case, their actions would not succeed, for example, in bringing into line forward and future spot rates of exchange.

## 18.6 Forecasting foreign exchange rates

A great deal of the activity in forex markets is based on expectations concerning future exchange rates. Consequently, much effort has gone into the development of models aimed at forecasting these rates. We have come across two approaches in this chapter – the use of market fundamentals and the application of the Efficient Market Hypothesis. We said, in Section 18.1, that fundamentalist models include important influences on the current and capital accounts of the balance of payments but this leaves matters very open. In fact, a wide range of **fundamentalist models** have been developed incorporating theories of the current and capital accounts of the balance of payments, the role of inflation, and theories of expectations formation. Fundamentalist models may be classified in a variety of ways.

One common classification is into *flow models*, those based on current account performance, and stock or *asset models* which stress the role of the capital account. Flow models incorporate relative prices (PPP), differences in the rate of productivity increase, and/or the relative rates of growth of domestic and world income. *Stock models* include relative interest rates and rates of growth of money supplies as well as exchange rate expectations and PPP among the market fundamentals. Most early fundamentalist models implied that real exchange rates should change relatively slowly over time. This left the major problem of explaining the volatility of exchange rates following the collapse of the Bretton Woods fixed exchange rate system of the International Monetary Fund in 1972.

One approach has been to attribute the volatility to the actions of governments and the intervention of central banks in the market. Governments, it has been argued, have often followed interventionist monetary policies which have kept exchange rates away from their equilibrium levels. Central banks have often bought and sold currencies (in effect acting as speculators) for political motives, attempting to influence the value of their own currencies or as part of a coordinated attempt to influence the values of important world currencies such as the dollar and the yen.

Another approach has been to incorporate time lags into models to explain why an exchange rate may not, once an equilibrium position has been disturbed, move directly and rapidly to a new equilibrium. One significant class of models of this kind has been the

overshooting exchange rate models (deriving from Dornbusch, 1976). These continue to assume the existence of long-run equilibrium rates of exchange and incorporate both uncovered interest rate and purchasing power parity. They also typically assume rational expectations and so market participants are assumed to make the best available use of all relevant information and to employ the best available model for forecasting future exchange rates. The result is that market agents are assumed to know what the long-run equilibrium exchange rate is. Nonetheless, despite this knowledge, exchange rates are held to overshoot their long-run equilibrium positions. That is, in the process of moving to a new equilibrium an exchange rate first shoots well beyond it in the opposite direction. This result is achieved by assuming that different elements in the model adjust at different speeds. For instance, one might assume that the money market in an economy adjusts instantaneously but that the goods market is slow to adjust to new influences. An alternative is to assume that the prices of tradable goods adjust quickly to international pressures but that the prices of non-tradables change only slowly.

Unfortunately, all of the fundamentalist models have problems. Flow models assume either that capital is completely immobile or that prices are fixed or both. Simple stock models assume that domestic and foreign assets are perfect substitutes for each other and that a maintained interest rate differential produces a continual flow of capital. This does not happen in practice. PPP plays an important part in all stock models and we have noted that empirical evidence provides little support for PPP. Expectations are important in many stock models but there is uncertainty as to how to model them. None of the models do well in testing, many performing worse than a simple random walk model. One study (by Meese and Rogoff, 1983) tested the predictions over the late 1970s of three fundamentalist models (a monetary model; Dornbusch's overshooting model; and a stock model which added current account factors to the Dornbusch model) together with those of a model stating simply that the exchange rate in the following period would be the same as in the current period. They found that the last model performed best! Models based on fundamentals faced particular difficulties in the first half of the 1980s as the dollar continued a prolonged increase in value (reaching its peak in February 1985) against all economic logic. This led to a number of developments in exchange rate theories.

Models were developed which attempted to explain sudden and apparently inexplicable jumps in the value of a currency through the phenomenon of **rational bubbles** (bubbles in which all participants know the correct model for the determination of the exchange rate but nonetheless the actual rate moves sharply away from equilibrium until eventually the bubble bursts). Models which explain these jumps but which continue to assume that the market is characterized by rational behaviour, start in a disequilibrium position and show how rational decisions may cause the market to move further away from equilibrium rather than returning to it.

For example, in trying to explain the inexorable rise in value of the US dollar between 1981 and 1985, Dornbusch started with an overvalued exchange rate. Investors were assumed to be risk neutral, and so a strategy that has a risk of high losses if things go wrong but a potential for high profits if they go right is equivalent to one in which potential losses and profits are both low. Investors had to compare two probabilities: that the exchange rate would return to equilibrium and that it would go on rising. The further the exchange rate was currently above the equilibrium rate, the greater was the potential loss for investors if it fell back to equilibrium and the greater the required profits had to be if the rate kept on rising. To put it another way, the greater the risk of a crash, the faster the rate of appreciation had to be to compensate for potential losses. Investors were thus obliged to go on buying the currency, pushing the rate up further and further, although there was no economic justification for doing so.

Some models allowed for the existence of two kinds of forecasters in the market. In Goodhart's (1988) model, for example, dealers make their decisions on the basis of a weighted average of the forecasts of market efficiency theorists and modellers of fundamentals, with the weights determined by the relative past success of the two forecasts. Again the model starts with an overvalued exchange rate. In the absence of news, the market efficient forecast is for no change while fundamentalists predict that the exchange rate will fall to equilibrium. Assume next that a random shock forces it further away from equilibrium. Both forecasts will be wrong but the market efficiency forecast will be less wrong and in the next period the weights are changed to reflect this, causing the predicted fall in the exchange rate to be smaller. Dealers thus buy more of the overvalued currency, forcing the rate up yet further.

An alternative approach has been to reject rationality in its narrow economic sense. It is argued that much trading in forex markets is based on ‘noise’ rather than ‘news’ and that this results in excessive volatility. Frankel and Froot (1990) developed a model similar to Goodhart’s, except that the bubble is not rational but speculative, being the outcome of self-confirming market speculations. Again there are two types of forecasters but this time they are fundamentalists and chartists. Fundamentalists (using an overshooting model) forecast a depreciation of the dollar which would be rational if there were no chartists. Chartists extrapolate recent trends based on an information set that includes no fundamentals. Box 18.4 indicates some of the features of exchange rate behaviour of interest to chartists and the extent to which market practitioners often combine fundamentalism and **chartism**.

In Frankel and Froot’s model, portfolio managers base their decisions on a weighted average of the forecasts of fundamentalists and chartists. Starting from an overvalued dollar (explained by overshooting), funda-

mentalists forecast depreciation but are incorrect. Consequently, portfolio managers increase the weight they assign to the forecasts of the chartists. In doing this, they reduce their weighted-average expectations of depreciation, raise their demands for the dollar and thus bring about the dollar’s continued appreciation. According to this view, in 1985 the dollar entered a new stage, with an ever-worsening current account deficit leading to the reversal of the overvaluation caused by the bubble. Frankel and Froot thus show how (non-rational but) sensible behaviour can generate not simply short-run volatility in exchange rates but also, and more importantly, large and cumulative exchange rate misalignments. More recent work has attempted to set such models within the framework of chaos theory in which very small changes in a system can produce dramatic results.

Speculators are also sometimes divided into those who think short term (which in this context refers to one week or less) and those with long-run horizons (up to three months), with short termers holding **extrapolative expectations** and long termers **regressive**

#### Box 18.4 Forecasting foreign exchange rates with the use of charts

Forecasters who make use of charts of past foreign exchange rates are attempting only to forecast the very short term. They assume that current demand and supply conditions can best be understood by examining the way exchange rates have been moving. Forecasting is based principally upon three elements in the charts.

##### (a) Trends

Whether an exchange rate has been rising or falling and the gradient of the trend – relatively flat trends are regarded as being more sustainable; steep trends as more volatile and subject to change. Trends can be established by constructing a channel of two parallel lines which encompass all the exchange rate movements. If an exchange rate then breaks out of its current channel there is a suggestion that the present trend is about to be reversed. Analysis of trends can be supplemented by calculation of moving averages.

##### (b) Support and resistance levels

A support level is a rate at which the currency appears to be strongly demanded. Thus, it is difficult for the exchange rate to fall below this level. A resistance level is the reverse – a rate which it is difficult for the currency to rise above. Support and resistance levels thus establish the width of the current channel in which the currency is trading. It is usually felt that if support or resistance levels are breached, the currency will fall sharply below the previous support level or rise sharply above the prior resistance level.

##### (c) Pattern recognition

This is the recognition of visual patterns in the chart – either continuation patterns (including ‘flags’ and ‘triangles’ which suggest that the rate will continue to follow its current overall tendencies; or reversal patterns (such as ‘head and shoulders’). In addition, chartists make use of information on momentum (the speed at which exchange rates change) and velocity (the rate of change of moving averages of exchange rates).

**expectations.** Much then depends on which group dominates the market at any particular time.

A number of special counter-examples have been developed to Friedman's (1953) argument, outlined above, that destabilizing speculators on average lose and are driven out of the market. Most of these involve heterogeneous actors, for instance 'suckers' who lose and 'sharpies' who win. In the simplest counter-example, based on the theory of rational speculative bubbles, each market participant loses if he does not go along with the herd.

## 18.7 Summary

The forex market is the market in which one national currency is traded for another. The market has grown hugely in recent years because of the rapid growth in international capital mobility and the volatility of exchange rates following the breakdown of the Bretton Woods fixed exchange rate system in the early 1970s. This volatility has greatly increased the need of firms to protect themselves against foreign exchange risk and has provided the opportunity to exploit exchange rate variations for profit.

Because exchange rates are prices of one currency in terms of another, they can be expressed in two ways – direct and indirect quotation. Currencies may be traded spot (for immediate delivery) or forward (delivery normally one month, three months or one year ahead). Exchange rate indices may be prepared expressing the average value of a currency against a basket of currencies or the real value of one currency

against another, allowing for differences in expected rates of inflation.

If foreign exchange markets were perfect or dominated by perfectly informed arbitrageurs and speculators, both spot and forward exchange rates would adjust immediately to any new information received by the market and it can be shown that forward rates should be good predictors of future spot rates of exchange. This prediction can be established through the development of a number of important relationships – interest rate parity (showing the relationship between interest rate differentials and forward discounts and premiums), the Fisher effect (the relationship between expected inflation rates and nominal interest rates), and purchasing power parity (the relationship between relative inflation rates and future spot rates of exchange). Although these relationships are important in theory, the Fisher effect and purchasing power parity do not perform well under empirical testing.

Nonetheless, both arbitrageurs and speculators play important roles in the foreign exchange market. As well as helping to bring about covered interest rate parity, arbitrageurs act to ensure that exchange rates are mutually consistent through exchange rate arbitrage. The contribution of speculators is much more controversial. They make use of instruments (such as forward exchange rates) that were initially developed to provide protection against foreign exchange risk to seek profits from outguessing the rest of the market. The fact that this is possible indicates that foreign exchange markets are, in fact, far from perfect. This is indicated also by the failure to develop reliable models for the forecasting of future rates of exchange.

### Key concepts in this chapter

Foreign exchange risk  
Spot and forward exchange rates  
Indirect quotation  
Forward premiums and discounts  
Effective exchange rate  
Efficient market hypothesis  
Exchange rate arbitrage  
Hedging  
Speculation  
Chartism

Direct quotation  
Exchange cross rates  
Real exchange rate  
Covered interest arbitrage  
Interest rate parity  
Purchasing Power Parity (PPP)  
Short versus long positions  
Rational versus speculative bubbles  
Fundamentalist models  
Extrapolative expectations

## Questions and problems

- 1 List as many items as you can of 'news' which would be likely to cause the value of your domestic currency to fall. Explain why in each case.
- 2 Explain the following terms in the context of the foreign exchange market:
  - (a) Covered interest arbitrage
  - (b) Long positions in a foreign currency
  - (c) Hedging
  - (d) Three-point foreign exchange arbitrage
- 3 Examine the 'Effective Index Rates' table from the *Financial Times* and answer the following questions:
  - (a) What information do the numbers in the table provide?
  - (b) What is meant by the words 'index rebased'?
  - (c) List the currencies that have, on average, strengthened since 1990.
- 4 In the 'Market Rates' column of the *Financial Times* of 8/9 May 2004, the three-month interest rate on sterling was quoted as 4.45 per cent; the three-month rate on US dollars was given as 1.19 per cent. On the same day, the spot rate of exchange for the pound against the dollar was:  $\$1 = \text{£}0.5599$ . On the assumption of perfect interest parity what would one have expected the forward premium/discount on sterling to have been? Why might the actual figure have been different from this?
- 5 (a) Describe the arbitrage operation that would produce a profit if the following set of spot exchange rates prevailed in a foreign exchange market, explaining how you arrived at your answer:
 

$\$US1 = \text{Nkr}6.8076$   
 $\$US1 = \text{€}0.8397$   
 $\text{€}1 = \text{Nkr}8.0025$

  - (b) What impacts would such an arbitrage operation have on the above set of exchange rates?
- 6 Examine the 'Currency Rates' table from any copy of the *Financial Times* and answer the following questions:
  - (a) What information is being given by the columns headed: 'Closing mid' and 'Day's change'?
  - (b) To what do the rows labelled 'Three month' refer?
  - (c) Why are the euro and sterling rows in the dollar column given in reciprocal form?
- 7 Explain the relationship postulated by the efficient markets hypothesis between forward rates of exchange and future spot rates of exchange.
- 8 You are given the following information:
 

Spot exchange rate  $\text{€}1 = \text{¥}111.9$

Expected euro area inflation rate for next year = 2.2%

Expected Japanese inflation rate for next year = 0.2%

Three-month money market interest rate for the euro = 2.08%

Three-month money market interest rate for Japan = 0.05%

On the basis of these figures calculate:

  - (a) the real exchange rate of the yen against the euro;

and

  - (b) the approximate three-month forward exchange rate of the yen against the euro.
- 9 Explain and defend the argument that speculation in markets is desirable.
- 10 How might one use the spot markets to obtain protection against foreign exchange risk? What advantages do the forward markets have for this purpose?
- 11 Explain the following:
  - (a) the relationship between spot and forward rates of exchange;
  - (b) purchasing power parity;
  - (c) the difference between a rational and a speculative bubble in the foreign exchange market.

## Further reading

Bank for International Settlements, *Triennial Central Bank Survey. Foreign exchange and derivatives market activity in 2001* (Basle, March 2002) [table B.7 (t18.1), table B.7 (t18.2), table B.4 (t18.3)]

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## Websites

[www.imf.org](http://www.imf.org)

## Chapter 19

# Derivatives – the financial futures markets

### *What you will learn in this chapter:*

- What derivatives are and why derivatives markets have grown so quickly
- What financial futures are and how futures exchanges are organized
- How to read financial futures information in the *Financial Times*
- What determines the pricing of financial futures in general
- How pricing rules may be applied to different types of financial futures

## 19.1 Introduction

One of the most striking developments in financial markets over the past quarter of a century has been the establishment and growth of financial derivatives markets. A derivative is a financial instrument based upon the performance of separately traded commodities or financial instruments. Many agricultural and mining products are traded on commodities markets by firms who are end users of those products. Equally, bond markets and foreign exchange markets allow end users to borrow or lend funds or to obtain foreign exchange. It is possible then to construct contracts which promise to deliver those products at some time in the future or give the right to buy or sell them in the future. These contracts may then be traded in markets different from the original commodities and financial markets (usually referred to as cash markets). Such contracts are known as **derivatives**. They are linked to the cash market through the possibility that a delivery of the primary commodity or instrument might occur. For example, if a trader is to carry out a promise to deliver an instrument in three months' time he will at some time during that three months need to buy the instrument in the cash market. It follows that the value of a derivative and hence its price varies as the price in the cash markets fluctuates. In practice, derivatives seldom lead to the exchange of the underlying instrument. Instead, contracts are *closed out* or allowed to lapse before the delivery.

Derivatives, then, are forward contracts that allow market agents to gamble on movements in the prices of other instruments without being required actually to trade in them. Their initial purpose was to allow traders to hedge risks that they faced in the cash markets as a part of their normal business activity by offsetting one type of risk (resulting, for example, from being long in the cash market) with the opposite risk in a derivatives market. Clearly, however, these markets provide additional possibilities for speculators to take on risk in the expectation that they will be able to out-guess the market. In the case of *financial derivatives*, the underlying instrument is financial: bonds, currencies, or stock exchange indices. Derivatives may be divided into three groups:

- (a) outright contracts
- (b) options, and
- (c) complex derivatives that combine elements of outright contracts and options.

*Outright contracts* establish a commitment to buy, sell, or exchange the underlying asset. Consequently, the payoffs on outright contracts are related symmetrically to the upwards and downwards movements of the prices of the underlying assets. *Forward contracts* are outright contracts to buy or sell a given asset at a specified later date when the contract is signed. A different type of outright contract is the *swap*. A swap is a contract for the exchange of payments calculated on different bases, for example the exchange of fixed-rate and floating-rate interest payments on a loan. *Options*, on the other hand, give only the right to buy or sell the underlying asset. Since the right to buy or sell need not be exercised, no definite commitment to buy or sell the underlying asset is established. Consequently, payoffs respond asymmetrically to price movements in cash markets.

Derivatives may be traded on organized exchanges with the exchange acting as an intermediary or directly between counterparties in over-the-counter (OTC) markets. Exchange trading establishes a tradable instrument that may be sold on to a third party. OTC contracts cannot be sold on in this way. A forward contract traded on an organized exchange is known as a **future**.

Although derivatives trading based upon commodities (agricultural products or minerals) has existed for several centuries, the need for financial derivatives markets was not seen until the early 1970s when the globalization of business, which had been proceeding apace for the previous 20 years, confronted the increased volatility of foreign exchange rates and increasing and fluctuating rates of inflation. As firms were exposed to increasing amounts of risk, risk management (or financial engineering) became a major concern of business. The most obvious form of *exchange rate risk* relates to current individual transactions (transactions exposure) – the possibility that apparently profitable activities will turn into losses because of unfavourable movements in exchange rates. More generally, the whole future trading performance of a foreign branch or subsidiary may suffer as a result of exchange rate changes, depending on the impact they have on factors such as relative inflation rates, interest rates, profit margins and market share (economic exposure). A different form of risk exists, however, for transnational firms with subsidiaries in other countries – the loss of value of foreign assets in the consolidated balance sheet of the parent company (translation exposure). In addition, the participation of firms in distant and foreign markets led not only to



increased exchange rate risk but also to greater default, market and sovereign risk.

Responses were many. To help counter foreign exchange risk, firms developed internal techniques relating to accounting systems and payment and invoicing procedures. Governments of developed countries became involved, providing exchange rate guarantees and other forms of insurance, in effect subsidizing the foreign activities of their exporting firms. Developments in international capital markets allowed firms to borrow more easily in foreign currencies against anticipated future payments in those currencies. The growth of Eurocurrency markets, in particular, allowed firms to obtain foreign currency overdrafts to offset long positions in major currencies. Forward foreign exchange markets developed and banks began to use them more imaginatively, offering, for example, optional date forward contracts in which a firm is given an option regarding the maturity date within a specified period and is charged the premium or discount that applies to the most costly of the settlement dates within the period.

These, and other activities, aimed to remove or reduce the risk faced by firms in particular transactions. An alternative approach in a generally risky environment is to oppose one form of risk to another and hence scope existed for the creation of new instruments which themselves carried risk but which firms could use to balance risks in other elements of their portfolios. More importantly, increases in the range of available instruments allowed firms to diversify their portfolios of assets further. By so doing, they were able to reduce overall risk.

At the same time as firms were becoming increasingly international, they were merging or taking over other firms in different industries – the number of conglomerates was increasing. It was only a matter of time before large firms began to see trading in financial instruments as equivalent to any other part of their business. Risky situations came to be seen as opportunities for making profits that were equivalent to profits made from selling cars, chemicals or airline tickets. This great growth in financial activity was necessarily accompanied by a vast growth in international banking, with banks acting as guarantors, providing information and expertise and speculating on their own behalf in the new markets. Banks, seeking to manage the risk they were taking on in order to meet the needs of end users, increasingly engaged in transactions with other banks to the point where

interbank transactions have come to make up a very high proportion of total financial activity.

The great growth in derivatives is indicated by the very rapid increase in the number and size of the exchanges on which they are traded. In the 1980s and 1990s many new derivatives exchanges were opened. Recently, there has been a good deal of consolidation through mergers and takeovers, especially in Europe. The two big Chicago exchanges that started life as commodities markets, the Chicago Board of Trade (CBOT) and the Chicago Mercantile Exchange (CME), remain central but they have been joined in importance by the European Exchange (EUREX), the result of a 1998 merger between German and Swiss derivatives exchanges (*Deutsche Terminbörse* and the Swiss Options and Financial Future Exchange). More recently, Euronext, formed by a merger of the Paris, Amsterdam, Brussels and Lisbon stock exchanges, has taken over the London International Financial Futures Exchange (LIFFE).

It is these relatively new instruments and markets that we need to explore in this chapter and the next. We deal with futures in this chapter and in Chapter 20 consider options, swaps and more complex derivatives.

## 19.2 The nature of financial futures

A futures contract is a forward contract traded on a derivatives exchange. It is an agreement to exchange a given asset at a specified later date at a price established when the contract is signed. The buyer goes long in the cash market, that is he contracts to take delivery of the underlying instrument in the future. The seller goes short, contracting to deliver the instrument in the future. An exchange-traded contract is standardized in terms of both time period and amount. It specifies the quantity and quality of the underlying asset as well as the date of delivery and the agreed price at which delivery of the underlying asset will take place, should delivery actually occur. Thus, the three-month Euroswiss futures contract offered by the LIFFE specifies an amount of SFr1 million, while the US dollar currency futures offered by the CME specifies an amount of €125,000. Bond futures specify the amount of the bond and its interest rate coupon, for instance, a \$100,000 nominal 20-year Treasury bond with a 7 per cent coupon. As long as single contracts are for relatively small amounts, this does not

reduce the flexibility of the market by much since it is always possible for a market agent to increase his or her exposure by buying or selling a number of contracts on the same underlying asset for the same period.

In contrast, OTC forward contracts are direct contracts between a bank and another market agent. The amount of the contract and its terms are determined by the two counterparties. Flexibility is possible in the time period as well as in the amount. Crucially, an OTC forward transaction does not produce a tradable instrument that can be sold on to a third party in the way that futures can.

Until recently, all trading at futures exchanges took place in trading *pits*, areas of the trading floor devoted to the trade of a particular contract. This method of trading between members, which allowed all traders to hear every negotiated price, is known as **open outcry**. However, financial futures exchanges have developed automated systems which allow screen-based trading and all electronic exchanges have been opened. Open outcry will everywhere soon be a memory from a more colourful past.

Most financial futures contracts have four delivery dates per year. There are a number of very precise delivery details including lists of eligible assets which will satisfy the delivery requirements of a contract and methods of determining the final settlement price. However, delivery does not usually occur as buyers and sellers of futures contracts are not normally end users of the underlying asset. Traders using futures to hedge against risk to which they are exposed in the cash market are seeking to lock into existing exchange or interest rates on future transactions. In such cases, the period for which the hedge is needed is unlikely to coincide with the time period of the futures contract. Once a firm has traded out of its open position in the cash market, it will no longer need the hedge in the futures market.

Financial futures may also be traded by speculators who wish to profit from the rises or falls they expect to occur in interest rates, exchange rates or stock exchange indices. Through futures, they can take a view about trends in cash markets without having to purchase the underlying currency or financial instrument. A speculator who felt that interest rates were likely to rise or a currency's value decline could go short in the relevant asset by selling a futures contract. Traders who are using the futures market to create an open position in this way usually close the position once they have achieved their profit objectives.

If it does not seem likely that they will make the hoped-for profit, they will probably cut their losses before delivery is due. Investors wishing to cancel out the obligation to deliver or to accept delivery of the instrument can do so by entering into an offsetting (or reversing) contract. That is, if a market agent has entered into a contract to deliver a particular instrument, s/he can offset this by taking out another contract which requires him or her to take delivery of the same amount of the same instrument on the same date. His or her obligations under the two contracts then cancel out. In some cases, such as futures based upon equity market indices or interest rates on short-term deposits, no delivery is possible and traders meet their obligations by making cash payments based upon the changes in the value of the index or interest rate in question.

To reduce default risk and hence to make futures more easily tradable, futures exchanges make use of a **clearing house** which covers any default arising from a contract. Therefore, although all futures contracts involve a buyer and a seller, the obligation of each is to the clearing house, not to each other. That is, after the transaction has been recorded, the clearing house substitutes itself for the counterparty and becomes the seller to every buyer and vice versa. Therefore, the only default risk faced by someone entering into a futures contract stems from any doubts about the creditworthiness of the clearing house itself. This is, in turn, reduced in a number of ways. Firstly, all transactions must take place through members of the exchange who act as brokers for anyone wishing to invest in the market. The number of members (or seats on the exchange) is limited. Seats on an exchange may be purchased from existing members but new members must demonstrate their creditworthiness to the exchange. In addition, the members of the exchange must keep with the clearing house special accounts (margin accounts) that are adjusted from day to day to ensure that members are always able to settle their debts to the clearing house. Investors must, in turn, maintain similar accounts with the members of the exchange. This is known as trading on margin, and futures positions are said to be margined on a **marked-to-market** basis. These rules should mean that the clearing house is able to guarantee the performance of every contract entered into on the exchange.

The first step in the system is that an investor must, at the start of the contract period, pay into a margin account a small percentage (the **initial margin**) of the

value of the contract. The size of the initial margin is intended to reflect the maximum daily loss likely to arise on the contract and so will be related to the volatility of the price movements of that instrument. Initial margins are generally between 1 and 5 per cent of the value of the contract. Margin accounts must then be adjusted daily to reflect gains or losses on a contract over the day. Assume a contract has a commencing value of \$10,000 with each counterparty paying an initial margin of \$500 into their margin accounts. Assume next that during the first day's trading, the contract's value rises to \$10,100, representing a loss for the seller and a gain for the buyer of the contract. The clearing house would then transfer \$100 from the seller's margin account to that of the buyer. Should the price rise again the next day, a similar transfer would occur. If the balance in the seller's account fell below a specified level (the **maintenance margin**), s/he would be required to make additional payments into the account (the **variation margin**) in order to keep the account at or above an acceptable minimum balance. On the other hand, the buyer could, in this case, withdraw the daily profits from his or her margin account. Some exchanges (for example, LIFFE) set the maintenance margin at the same level as the initial margin.

Of course, should the value of the above contract fall below £10,000, the buyer's margin account would fall and s/he might be required to make additional payments. Failure to make such payments immediately would lead to the closure of the contract against the defaulting party. The system of marking accounts to market daily prevents losses from accumulating, and the holding of margins by the clearing house removes most default risk.

Daily gains and losses on contracts are determined by the settlement price, which is set by the settlement committee of the exchange. It is normally the closing price for the day (the last price at which the contract has traded). However, if a contract has not traded for some time prior to the market's close, the committee may set a different settlement price in an attempt to reflect accurately the trading conditions at the close of the market. The freedom that the settlement committee has to fix the settlement price also allows it to protect the clearing house from the remaining default risk that might arise from very large daily swings in the price of a contract. They may do this by setting price limits – maximum movements up and down from the previous day's settlement price. If these limits would

otherwise be broken, the market closes **limit-up** or **limit-down**. The aim is to prevent losses going above the amounts held in margin accounts, forcing or tempting losers to default. The hope is that the temporary closure of the market might lead traders to reassess their positions. However, the system of price limits has its disadvantages. As long as the market remains closed positions cannot be closed out and contracts become illiquid, destroying one of the major advantages of futures contracts, their tradability. For this reason, many exchanges do not operate price limits during the delivery month of a contract.

The relative smallness of the margin requirements is responsible for another important aspect of futures markets – their high *gearing* (or leverage). If all goes well, the effective rate of profit on a futures contract can be very high. To see this, consider the following simple example. Assume that in March an investor buys a €25,000 contract on US dollars for delivery in June at a price of €1 = \$1.20. The contract value is \$150,000. Assume an initial margin of 2 per cent (\$3,000). Assume next that the value of the euro rises steadily over the contract period to €1 = \$1.30 and the contract price rises in line with it. The value of the contract would have been rising steadily and no further margin payments would have been required. At the end of June, the investor takes delivery of the euro at €1 = \$1.20 and sells it spot at €1 = \$1.30. The buyer of the contract makes a profit (and the seller a loss) of \$12,500 ( $125,000 \times 0.10$ ) but has only had to outlay \$3,000, giving a per annum rate of return of over 1,500 per cent! Alternatively, he could take his profit by reversing the contract – taking out another contract to *sell* €125,000 in June at the now higher contract price.

Sadly, however, life is not quite as easy as this. In addition to making margin payments, investors must pay brokers a negotiated commission for executing orders. Commission (sometimes referred to as the direct cost of the contract) is charged on both the opening and the closing of a position and is normally payable either when the position is closed or when delivery takes place. More seriously, the value of the euro may have fallen, requiring the investor to advance more margin. Suppose that the day after the contract was taken out, the value of the euro fell to €1 = \$1.15. The value of the contract would have fallen to \$143,750 and (on the assumption that the maintenance margin was the same as the initial margin) a variation margin payment of \$6,250 would need to be made. If, the


euro later rose in value, some of this variation margin could be withdrawn, but an investor would need to be fortunate not to have to make some variation margin payments over the life of a contract and thus the average amount held in the margin account over the contract period is likely to be above the initial margin. The possibility that additional margin payments may have to be made on a daily basis also requires an investor to keep a certain amount of his or her assets in a very liquid form. Of course, if the value of the euro did not rise again during the life of the contract, the investor would be required on the delivery date to buy euro at \$1.20 and would only be able to sell them spot for \$1.15, producing a loss of \$6,250. Again, the

investor could avoid having to receive and then re-sell sterling by reversing the contract before the delivery date but this would not reduce the loss. Futures contracts, therefore, provide the prospect of high rates of return but involve considerable risks.

### 19.3 Reading the *Financial Times*

On the 'Currencies, Bonds and Interest Rates' page of the *Financial Times*, a table of a range of short-term interest rate futures is provided. In Table 19.1, we reproduce the table for 16 March 2004.

**Table 19.1** Interest rate futures

Mar 15		Open	Sett	Change	High	Low	Est. vol	Open  int.
Euribor 3m*	Mar	97.95	97.95	–	97.95	97.95	12,946	524,289
Euribor 3m*	Jun	98.02	98.02	+0.01	98.03	98.01	114,563	603,749
Euribor 3m*	Sep	97.98	98.00	+0.02	98.02	97.98	93,336	481,877
Euribor 3m*	Dec	97.87	97.90	+0.03	97.92	97.87	100,094	473,509
Euribor 3m*	Mar	97.73	97.76	+0.03	97.78	97.73	84,573	338,645
Euroswiss 3m*	Mar	99.75	99.75	–	99.75	99.75	150	62,408
Euroswiss 3m*	Jun	99.68	99.70	+0.01	99.71	99.68	8,843	117,006
Sterling 3m*	Mar	95.73	95.73	–	95.74	95.72	13,490	175,959
Sterling 3m*	Jun	95.60	95.58	–0.01	95.61	95.56	50,140	239,224
Sterling 3m*	Sep	95.50	95.47	–0.02	95.51	95.46	35,555	169,890
Sterling 3m*	Dec	95.42	95.38	–0.02	95.43	95.36	42,259	183,967
Sterling 3m*	Mar	95.34	95.30	–0.02	95.36	95.28	11,675	107,031
Eurodollar 3m†	Mar	98.89	98.89	–	98.89	98.89	3,845	692,299
Eurodollar 3m†	Jun	98.83	98.82	–	98.83	98.81	42,564	879,055
Eurodollar 3m†	Sep	98.68	98.68	–	98.70	98.66	30,675	890,826
Eurodollar 3m†	Dec	98.45	98.44	–	98.49	98.40	54,969	731,812
Eurodollar 3m†	Mar	98.16	98.14	–0.02	98.21	98.10	37,514	503,136
Eurodollar 3m†	Jun	97.84	97.80	–0.02	97.88	97.76	5,623	394,568
Eurodollar 3m†	Sep	97.55	97.47	–0.03	97.55	97.44	2,082	331,031
Fed Fnds 30d‡	Apr	99.000	99.000	–	99.010	99.000	2,346	85,803
Fed Fnds 30d‡	May	98.995	98.995	–	99.000	98.995	1,562	54,603
Fed Fnds 30d‡	Jun	98.990	98.990	–	98.995	98.990	4,134	42,535
Euroyen 3m‡‡	Mar	99.910	99.911	+0.001	99.910	99.910	25	215,950
Euroyen 3m‡‡	Jun	99.920	99.920	–	99.920	99.915	3,428	184,545
Euroyen 3m‡‡	Sep	99.890	99.890	–0.010	99.895	99.890	1,370	142,077

Contracts are based on volumes traded in 2001.

Sources: \* LIFFE. † CME. ‡ CBOT. ‡‡ TIFFE.

Source: *Financial Times*, 16 March 2004.

**Box 19.1 Short-term interest rate futures prices and short-term interest rates**

Table 19.1 is taken from the *Financial Times* of 16 March 2004 and the settlement prices given are for the previous day. Delivery dates (the third Wednesday of the month) for the June, September, December and March contracts were thus approximately three months, six months, nine months and 12 months ahead. By comparing the interest rates implied by the futures prices with the interest rates for similar periods in the 'Market Rates' table on the same day, we can make an interesting point. Consider the Three Month LIFFE Sterling contract shown in Table 19.1. From the settlement prices (Sett) for this contract, we can derive the following interest rates:

June 4.42%; September 4.53%; December 4.62%; March 4.7%

£ Libor market interest rates on the same day were:

one month	4.11%
three months	4.27%
six months	4.39%
one year	4.55%

Although there are small differences between the two sets of rates, it is clear that the derivatives price is closely related to the underlying money markets. Both sets of figures suggest an expected rise in short-term interest rates over the coming year. It is also clear that the interest rate derived from the futures price is consistently above the spot interest rate – a condition known as *normal backwardation*. Can you think of a reason why this might be so? (We discuss this case in Box 19.2 later in the text.)

All the contracts in Table 19.1 are contracts on three-month time deposits. The buyer of such a contract would, on delivery, receive a time deposit at an eligible bank of the amount specified in the contract. For example, the Euroswiss 3m contract is for a deposit of SFr1 million; the Eurodollar 3m contract is for \$1 million; and the Sterling 3m contract for a deposit of £500,000. The gamble in such contracts relates to changes in short-term interest rates relative to those rates at the time the contract is negotiated. Contract prices are quoted in terms of *points of 100%* or *100 rate*. That is, the price of the contract is quoted in the form of subtractions from 100 per cent – a price of 97.95 represents an annual interest rate of 2.05 per cent (100–97.95). The minimum price movement (or *tick size*) on most of these contracts is one basis point (0.01 per cent). In the case of a \$1 million three-month time deposit, a change in the price of one basis point translates into a change in the value of the contract of \$25 (0.01 per cent per annum interest on \$1 million for three months). This is known as the *tick value* of the contract. The tick value provides a simple way of quoting the profit or loss on a contract – a profit of 10 ticks on the Three Month Eurodollar Futures contract is a profit of \$250; a 10 tick profit on the Three Month Euroswiss contract is SFr250.

**Exercise 19.1**

US\$ Libor money market interest rates on the 15 March 2004 were:

one month 1.09%; three months 1.11%;  
six months 1.15%

Would you expect the price of three-month Eurodollar futures shown for September to be higher or lower than that for March? Check your answer with Table 19.1.

Quoting the price as an index maintains the usual inverse relationship between the price of a financial instrument and the yield on it. As explained in Section 19.4 below, although the settlement price at the time of delivery is based on the spot interest rate on the last trading day of the contract, the interest rate implied by the futures price during the life of the future can differ from the interest rate on the underlying asset in the cash market. Some examples of the relationship between futures prices shown in Table 19.1 and spot market interest rates are shown in Box 19.1.

For each contract listed in Table 19.1, prices are quoted for a series of delivery dates. Delivery days are in March, June, September and December. The

delivery day on each contract is the first business day after the last trading day, and the last trading day is the third Wednesday of the delivery month. Table 19.1 has seven columns. These are as follows:

Open: the price of the contract at the beginning of business.

Sett: the settlement price – the price at which contracts are settled at the end of the day.

Change: the change in the settlement price from the previous day – on some occasions this is not equal to the difference between the first two columns. For example, September Three Month Eurodollar Futures have an opening price of 97.55 and a settlement price of 97.47 but the change is given as only –0.03, suggesting that few contracts had changed hands the previous day and that the opening price the following morning had been different from the previous settlement price.

High: the highest price reached for the contract on the day.

Low: the lowest price reached for the contract on the day.

Est. vol: the estimated number of contracts entered into during the day.

Open int: open interest – the number of outstanding contracts on the previous trading day.

A table of currency futures shown in Table 19.2 provides similar information except that prices here are quoted in exchange rates. For example, for €-Dollar futures offered by the Financial Instrument Exchange (FINEX) we are told that a contract is for €200,000, that for €-Sterling is for €100,000 and so on. The price is quoted *per euro*. That is, the price reflects the indirect quotation of the euro – how much €1 exchanges for in sterling, US dollars and yen, respectively. The latest price shown in Table 19.2 for the €-Dollar futures for June delivery is €1 = \$1.1971. The settlement price for June delivery for €-Sterling futures is €1 = £0.6693.

Table 19.3 reproduces a *Financial Times* table showing a sample of bond futures. They are typically based on notional government bonds. The table indicates down the left-hand side the bonds on which the futures are based together with the names of the exchanges offering the contracts. For example, Euro-Bobl-Eurex is a contract offered by EUREX on a notional medium-term debt instrument issued by the German Federal Government with a term of 4.5 to 5.5 years and a coupon of 6 per cent. The contract size is €100,000. Kofex relates to a future offered by the Korean Futures Exchange on a notional three-year bond. The form of the quotation is also given. Interest rates in the USA are quoted in 32nds of 1 per cent.

**Table 19.2** Currency futures

Apr 19		Open	Latest	Change	High	Low	Est. vol	Open int	FT
€-Sterling*	Jun	0.6715	0.6693	–	–	–	414	11,193	
€-Dollar*	Jun	1.1960	1.1971	–	1.2025	1.2025	310	403	
€-Yen*	Jun	129.20	128.75	–	129.57	128.56	374	12,516	
\$-Can \$ †	Jun	0.7415	0.7423	+0.0012	0.7436	0.7404	3,160	58,576	
\$-Euro € †	Jun	1.2000	1.1997	+0.0026	1.2063	1.1982	8,821	107,470	
\$-Euro € †	Sep	1.1983	1.1974	+0.0026	1.2033	1.1963	8	856	
\$-Sw Franc †	Jun	0.7750	0.7752	+0.0021	0.7805	0.7742	2,104	37,527	
\$-Yen †	Jun	0.9310	0.9233	–0.0063	0.9310	0.9215	8,903	104,956	
\$-Yen †	Sep	0.9275	0.9263	–0.0063	0.9275	0.9249	2	589	
\$-Sterling †	Jun	1.7910	1.7997	+0.0104	1.8059	1.7898	2,451	41,925	
\$-Aust \$ †	Jun	0.7407	0.7402	+0.0015	0.7462	0.7397	666	6,481	
\$-Mex Peso †	Jun	88,050	88,175	+125	88,425	87,925	2,524	5,928	

Sources: \* FINEX; Sterling €100,000, Dollar: €200,000 and Yen: €100,000. †CME: Australian \$: A\$100,000, Canadian \$: C\$100,000, Euro: €125,000; Mexican Peso: 500,000, Swiss Franc: SFr125,000; Yen: Y12.5m (\$ per Y100); Sterling: £62,500. CME volume, high & low for pit & electronic trading at settlement. Contracts shown are based on the volumes traded in 2003.

Source: *Financial Times*, 20 April 2004.

Table 19.3 Bond futures

Apr 19		Open	Sett	Change	High	Low	Est. vol	Open int.	FT
Euro-Eurex	Jun	114.26	114.38	+0.13	114.57	114.18	717,629	1045,977	
	Sep	113.86	113.95	+0.13	114.09	113.82	2,309	23,034	
Japan 10yr-TSE	Jun	137.65	137.65	+0.14	137.65	137.56	18,763	104,312	
	Sep	136.64	136.51	+0.37	136.64	136.64	0	2,017	
US Tr long-CBOT	Jun	108–08	108–00	–0–08	108–22	107–31	163,493	461,856	
	Sep	106–31	106–20	–0–07	107–08	106–19	1,921	19,753	
US Tr 10yr-CBOT	Jun	111–200	111–135	–0–065	111–290	111–130	404,267	1303,344	
	Sep	110–090	109–310	–0–075	110–145	109–305	10,934	105,223	
Euro-Bobl-Eurex	Jun	111.67	111.70	+0.04	111.83	111.65	352,472	684,778	
	Sep	111.22	111.09	+0.03	111.22	111.10	12,504	7,814	
Euro-Schatz-Eurex	Jun	106.20	106.18	–0.01	106.24	106.18	251,945	674,854	
	Sep	105.97	105.94	–0.01	105.97	105.97	402	2,914	
US Tr 5 yr-CBOT	Jun	110–305	110–255	–0–055	111–050	110–250	206,371	965,595	
	Sep	109–265	109–180	–0–055	109–265	109–180	1,261	64,456	
Long gilt-Liffe	Jun	107.39	107.18	–0.21	107.43	107.14	22,464	172,378	
	Sep	–	106.83	–0.23	–	–	0	3	
SFE 3 yr	Jun	94.45	94.45	+0.02	94.45	94.43	5,406	358,451	
Kofex 3 yr	Jun	109.29	109.22	+0.00	109.37	109.19	26,403	76,108	

Contracts shown are the most heavily traded in 2003. Open interest figures and are for the previous day. CBOT volume, high & low for pit & electronic trading at settlement. For more contract details see: [www.eurexchange.com](http://www.eurexchange.com), [cbot.com](http://cbot.com), [tse.or.jp](http://tse.or.jp), [liffe.com](http://liffe.com). Changes based on prev sett price. US data in 32nds. US latest prices Source: Reuters.

Source: *Financial Times*, 20 April 2004.

Hence, prices on notional US Treasury Bond futures are quoted in that way with 106–31 being read as 106 31/32. In Europe, on the other hand, interest rates are quoted in decimals, hence the settlement prices of 114.38 and 113.95 for Euro Eurex.

Another important point stems from the fact that long-term bond futures are based on notional bonds since, in the unlikely event that the contract leads to the delivery of bonds, the seller of the contract is extremely unlikely to be able to deliver a bond with the exact characteristics of the notional bond. Thus, the exchange establishes a list of eligible bonds, any one of which may be used to effect delivery. For example, the notional bond may have a period to maturity of 20 years and a coupon rate of 9 per cent while the eligible list established by the exchange might include bonds with periods of maturity between 15 and 25 years and coupon rates ranging from 6 to 12 per cent. This causes a complication at the point of delivery because the buyer of the contract must

pay for the bond actually delivered whereas the final settlement price of the futures contract will be based on the notional price. To overcome this problem, the exchange publishes a **price factor** or **conversion factor** for each eligible bond that reflects the difference in value between the notional bond and the actual bond delivered. The final settlement price for the notional bond is multiplied by the price factor (which may be either greater than or less than one). This accounts for some of the high settlement prices quoted such as for notional 10-year bond with the Tokyo Stock Exchange (TSE). The bonds available for delivery in these cases must have characteristics quite different from the notional bonds or very profitable arbitrage opportunities would exist between the bond market and the futures market.

Another complication arises because, although both futures contracts and bonds trade at clean prices, bonds have accrued interest added on whereas futures contracts do not. Consequently, allowance

**More from the web**

Contract details for the various futures referred to in *Financial Times* tables can be obtained from the websites of the exchanges involved.

For example, for EUREX, consult [www.eurexchange.com](http://www.eurexchange.com). Clicking on 'Products' on the left-hand side brings up a search facility that allows you to select one of four product groups. Selecting 'Interest Rate Derivatives' brings up a list of derivatives contracts offered by the exchange.

Addresses of other derivatives exchanges mentioned in Tables 19.1, 19.2 and 19.3 are:  
 Chicago Board of Trade (CBOT) [www.CBOT.com](http://www.CBOT.com)  
 Chicago Mercantile Exchange (CME) [www.cme.com](http://www.cme.com)  
 Financial Instruments Exchange (FINEX) at the New York Board of Trade [www.nyce.com](http://www.nyce.com)  
 Korean Futures Exchange (KOFEX) [www.kofex.com/english/main.asp](http://www.kofex.com/english/main.asp)  
 London International Financial Futures Exchange (LIFFE) [www.liffe.com](http://www.liffe.com)  
 Sydney Futures Exchange (SFE) [www.sfe.com.au](http://www.sfe.com.au)  
 Tokyo Financial Futures Exchange (TIFFE) [www.tiffe.or.jp](http://www.tiffe.or.jp)  
 Tokyo Stock Exchange (TSE) [www.tse.or.jp/english](http://www.tse.or.jp/english)

has to be made for interest accrued between the date of the coupon prior to the delivery of the bond and the delivery date. These two modifications mean that the buyer of the contract must pay for the bond delivered to him, the final settlement price for the notional bond plus any unpaid interest accrued on the bond.

Of the bonds eligible for delivery, the seller always chooses the bond which is cheapest for him to deliver – the cheapest to deliver (CTD) bond. Delivery may take place on any day of the delivery month, although in practice it is always on either the first or the last day of the month. If the current yield on the bond that is to be delivered is greater than the money market interest rate, the seller will retain the bond until the last day of the month before delivering it. On the other hand, if money market interest rates are higher, s/he will deliver the bond on the first day of the month.

Stock exchange index futures and futures on a selection of individual stocks are found in the stock exchange pages of the *Financial Times*. The Equity Index Futures table currently provides information on a FTSE 100 (Financial Times Stock Exchange Index) futures contract as well as on a selection of contracts on the indices of other exchanges including the Tokyo Stock Exchange's Nikkei 225 index, the Standard and Poor's (S&P) 500 index, the Dow Jones Industrial Average (DJIA) and a range of indices of European stock markets. Prices are quoted directly in terms of the index.

**19.4 The pricing of futures**

We have said above that very few, if any, end users of the underlying instrument use the futures market as a means of buying or selling that instrument. Thus, we have three principal types of agent – hedgers, speculators and arbitrageurs. For ease, hedgers can be assumed to be participants with open positions in the cash market who are using the futures market to offset their cash risk.<sup>1</sup> They may either be long in the cash market and wish to go short in the futures market or vice versa. Speculators, in effect, provide the insurance for hedgers by being prepared to take an open position. If hedgers in general wish to go short in the futures market, they can only sell contracts if speculators are prepared to go long and vice versa.

A major role in determining the pricing of futures is, however, played by arbitrageurs. The nature of their role can be seen by looking at forex futures. The existence of a forward market in foreign exchange as well as forex futures contracts means that there are two markets in what is essentially the same product. Consequently, arbitrage is possible between the two markets and this should ensure that variations in the forward exchange rate of the euro should be reflected in changes in the price of a euro futures contract. If this did not occur, there would be a profit opportunity for arbitrageurs. Almost all forex futures contracts are priced in terms of dollars per unit of the other currency. Suppose the three-month forward value of the dollar per euro fell from  $\text{€1} = \$1.20$  to  $\text{€1} = \$1.25$

<sup>1</sup> In practice, hedgers could be using futures markets to diversify their portfolio and so reduce specific risk as part of a general risk management strategy.



but the price of the equivalent futures contract did not change. Arbitrageurs would be able to buy euro futures contracts allowing delivery of euro in three months' time at an exchange rate of \$1.20 to the euro and, at the same time, sell euro three months forward at the higher exchange rate. At the end of the three months, they would take delivery of the euro under the futures contract and sell them under the terms of the forward contract, making a risk-free profit. The increased demand for the futures contract would force up the futures price while the sale of euro in the forward market would push down its forward exchange rate, changing its relationship with the spot rate and opening up possibilities for interest rate arbitrage. We would not return to equilibrium until the spot and forward exchange rates and the price of the futures contract had come into line and all arbitrage profit opportunities had been removed. This is not to say that prices in the futures, forward and spot markets move exactly together. We shall see that there is a financing cost associated with arbitraging between spot and futures markets; there are always transactions costs; and futures and forwards contracts while dealing in essentially the same product are not exactly the same. Among other things, futures contracts involve daily cashflow settlements while forward contracts do not.

Nonetheless, the prices of futures must be linked through arbitrage to the prices of the underlying instrument in the cash market. This link provides the basic theory for the determination of futures prices (the cost-of-carry model). It stems from the fact that buying the underlying asset and holding it for three months is always an alternative to buying a futures contract requiring one to take delivery of the asset in three months' time. Equally, going short in the cash market

is an alternative to selling a futures contract which may require its delivery in the future. Further, on the delivery date itself, the value of a futures contract is determined by the cash price of the underlying asset.

### 19.4.1 The cost-of-carry model of futures pricing

According to the cost-of-carry model, futures prices depend on the price of the underlying instrument and the cost of holding it from the date of purchase to the delivery date. For financial instruments, the principal **cost of carry** is the financing cost. If a trader buys a financial instrument and holds it for three months, the financing cost (or cost of carry) is the interest paid or forgone on the funds needed to purchase the instrument less any yield obtained on it while it is being held. That is:

$$Cc = P_s(i - c) \quad (19.1)$$

where  $Cc$  is the cost of carry;  $P_s$  is the cash price of the underlying asset;  $i$  is the interest rate payable on the funds borrowed to purchase the instrument and  $c$  is any yield on the asset during the period in which it is held. The costs of borrowing in futures markets are usually low both because those borrowing are normally large financial institutions and because the purchased instrument may act as collateral for the loan. In our examples below, we shall assume that traders in the futures market are able to borrow at money market rates and in any examples we shall use figures from the Market Rates columns of the *Financial Times*.

The basic cost-of-carry rule for all futures is that the futures price, *in a perfect market*, must be equal to the cash price of the instrument plus the carrying charges necessary to carry the commodity forward to delivery.

$$P_f = P_s + Cc \quad (19.2)$$

and

$$P_f = P_s(1 + i - c) \quad (19.3)$$

where  $P_f$  is the futures price.

This is known as the **fair price** of futures and is the price that produces for the purchaser of a futures contract a risk-free rate of profit just equal to the costs of carry. This derives from the arbitrage opportunity which would exist in a perfect market if the futures price were different from the cash price of

#### More from the web

A great deal of information on the state of international derivatives markets is provided by the Bank for International Settlements ([www.bis.org](http://www.bis.org)). Every six months, a report is published on OTC derivatives market activity. The *BIS Quarterly Review* (downloadable in pdf format) also publishes regular reports on international banking and financial market developments. Go to the BIS home page and click on 'Publications and Statistics'.

the instrument. If the futures price were greater than the cash price (including carrying costs), an arbitrageur could borrow and use the funds obtained to buy the instrument in the cash market while, at the same time, selling a futures contract promising delivery of the same amount of the instrument at the end of the period of the loan. On the delivery date, s/he would meet the requirements of the futures contract by delivering the instrument s/he had been holding and would use the funds received to repay the loan, leaving an arbitrage profit. No risk would have been involved in this 'cash-and-carry' operation. On the other hand, if the cash price were too high relative to the futures price, there would be a reverse cash-and-carry arbitrage opportunity. An arbitrageur could sell the instrument short, lend the proceeds of the short sale and buy a futures contract promising delivery at time  $t$ . At  $t$ , s/he would collect the proceeds from the loan (including interest) and pay for the instrument delivered under the terms of the futures contract. This would, in turn, be used to remove the short position in the asset, again leaving an arbitrage profit.

This example ignores the transactions costs that exist on both sides of the market, including fees to have orders executed (brokerage, commissions, exchange fees), any taxes payable, and the bid-offer spread found in all markets. Inclusion of these costs provides an area of indeterminacy for the futures price. If we were to assume that transactions costs were a fixed percentage,  $T$ , of the transaction amount and that these costs applied to the cash market but not the futures market, the above equation would become:

$$P_s(1 - T)(1 + i - c) \leq P_f \leq P_s(1 + T)(1 + i - c) \quad (19.4)$$

This equation defines the no-arbitrage band, outside of which there would be scope for arbitrage. If the futures price were to rise above the band, traders would buy the instrument in the cash market and sell the futures, forcing the futures price down and the cash price up, removing the arbitrage opportunity. With the futures price below the band, the reverse strategy would be profitable. In practice, transactions costs and hence the width of the no-arbitrage band vary amongst traders – a non-exchange member, for instance, faces much higher costs than a member. But for the market as a whole, the futures price should stay within or be rapidly forced back into the band set by the trader with the lowest transactions costs. With some financial futures, particularly stock exchange indices futures, attempting to arbitrage between cash

and futures markets is not risk free. This opens up a further possibility for differences emerging between cash and futures prices.

The next question we must ask is where, within the no-arbitrage band, the futures price will settle. In essence, this becomes a question of the price at which speculators will provide the insurance required by hedgers. From the point of view of the speculator, the important question is the relationship between the futures price and the future cash price of the underlying asset at the point of delivery specified in the futures contract. Thus, in order to decide what price s/he is willing to pay, a speculator needs to form an expectation of the future cash price. In a certain world, that expectation would always be correct and the futures would be priced to give the risk-free rate of return equal to the cost of carry. Under rational expectations and with risk-neutral speculators, the market average expectation of the future cash price would be correct and this expectation would determine the current futures price. Again only the risk-free profit in the cost-of-carry model would be received. The difference between the futures price and the current cash price of the underlying asset (known as the **basis**) would be equal to the cost of carry.

If the cost of carry is positive (that is,  $i > c$ ) and thus the futures price is above the cash price, the situation is known as a **contango**. In this case, the futures price is falling towards the cash price as the delivery day approaches since the amount of interest which must be paid to finance the holding of the underlying instrument is falling as the time to delivery shortens. If the futures price is below the cash price ( $i < c$ ) we have what is known as **backwardation**. Then the futures price is rising towards the cash price as the delivery date approaches. These same ideas can be applied to a series of forward contracts for different time periods since again arbitrage is possible. Consider two three-month Eurodollar contracts, with June and September delivery dates respectively. Just as it is possible to go long by buying the instrument and holding it rather than buying a futures contract, it is possible to buy a June forward contract, take delivery, and then hold the instrument until September as an alternative to buying futures with a September delivery date. Thus, the relationship between the fair prices for a June futures contract ( $P_1^f$ ) and a September contract ( $P_2^f$ ) is given by the cost of carry:

$$P_2^f = P_1^f + P_1^f (i - c) \quad (19.5)$$

If the cost of carry is positive ( $i > c$ ), contracts with more distant delivery dates will be trading at a premium to those with nearer dates. This is a **normal contango**. Where futures with more distant delivery dates are trading at a discount we have **normal backwardation**.

So far, we have been assuming risk-neutral speculators. But what if speculators are risk averse? Then they demand a risk premium and the current futures price varies from the cash price by more or less than the cost of carry, although it must always remain within the no-arbitrage band. The direction in which it varies will depend on the nature of the risk speculators are taking. If hedgers are long in the cash market and wish to go short in the futures market, speculators will need to go long in the futures market (buy the contract) if they are to provide the insurance hedgers are seeking. The risk for speculators would then be that the future cash price would be less than the futures price (they would have to sell the instrument when it was delivered to them at a lower price than they had paid for the futures). To reduce this risk, they would wish to pay a lower price for the futures than the expected future cash price. In other words, the risk premium built into the futures price would be negative and – as long as the risk premium were greater than any excess of  $i$  over  $c$  – we would have backwardation. If this were the normal state of affairs in the market, futures with more distant delivery dates would be trading at a discount and we would have normal backwardation.

For many years, dating back to Keynes (1930) and Hicks (1946), it was largely assumed that hedgers were firms that produced or utilized the underlying instrument and much of the research literature on futures markets (notably commodity futures) was based on the normal-backwardation theory (Phillips and Weiner, 1994). It follows from this theory that if expectations are on average correct, speculators as a group receive a rate of return greater than the risk-free rate which would have been justified. That is, on average, speculators should gain and hedgers should lose. More recently, it has been demonstrated by Grossman and Stiglitz (1980) and by Kyle (1985) that differential information can affect prices and profits in financial markets. Shleifer and Summers (1990) have also developed a model based on asymmetrically informed market participants, with the less informed referred to as ‘noise traders’. A literature has also developed based on portfolio theory (for example, the Capital Asset Pricing Model). Working on the assumption

that forward and futures markets are perfectly integrated with markets for other assets, it has reached the conclusion that risk premiums are not related to hedging, because speculators can costlessly enter forward and futures markets, and diversify the non-systematic risk assumed in these markets by combining them in portfolios with other assets. Hirshleifer (1988) has integrated the traditional theories of risk premiums based on hedging with the portfolio approach and has shown that non-marketability of claims on profits, together with fixed costs of entering asset markets, yield predictions similar to those of the simple normal-backwardation model. In contrast, the asymmetric-information view of trader performance predicts that traders with better information gain at the expense of ‘noise’ traders. If traders who operate in the cash market have superior information about future supply and demand conditions, the prediction of the normal-backwardation model can be reversed.

Let us next apply the general approach outlined here to some specific types of financial futures.

## 19.4.2 Pricing interest rate futures

We begin by considering short-term interest rate futures. We assume initially a perfect market and ignore any special features of a futures contract. Assume that the contract is based on three-month Eurodollar interest rates as in the contract offered by CME shown in Table 19.1. Thus, if the futures contract has 90 days to run to the delivery date and is for an eligible bill with a maturity on delivery of 90–92 days, a trader wishing to apply an arbitrage strategy would buy a 180-day bill so that it would have the correct properties on the delivery date 90 days hence. Because of this, the price of interest rate futures depends on **forward-forward interest rates** – interest rates for periods commencing at points of time in the future. Forward-forward rates are implied by the current rates for different maturities. Consider the following example.

In May 2004, the per annum rates of interest on three months’ and six months’ money in the euro area were 2.08 per cent and 2.11 per cent respectively. The forward-forward rate three months ahead is then the rate we would need to receive on funds deposited for three months in, say, September in order to ensure that funds invested in June for three months and then re-invested for another three months in September would produce the same return after six months as

funds invested in June at the spot six months' rate. That is, the forward-forward rate compounded with the spot three months' rate must equal the spot six months' rate. Expressing interest rates in decimals, we can write:

$$(1 + i_f)(1 + i_s) = (1 + i_t) \tag{19.6}$$

where  $i_s$  and  $i_t$  are the spot interest rates on the shorter-term (in our case three months) and the longer-term deposits (in our case six months) respectively and  $i_f$  is the implied forward-forward interest rate  $s$  time periods ahead. From Equation 19.6, we can write:

$$i_f = \frac{(1 + i_t)}{(1 + i_s)} - 1 \tag{19.7}$$

and using the euro rates above, remembering to divide the per annum rates by four and two to find the yield for three months and six months respectively, we get:

$$i_f = (1.0106/1.0052) - 1 = 0.0054$$

Multiplying this by four to obtain a per annum rate gives us 0.0216 and, in percentage terms, the forward-forward interest rate three months ahead is 2.16 per cent. It is entirely logical that in a case like this where the yield curve is sloping upwards the forward-forward interest rate should be higher than both the three months' and six months' spot rates. Exercise 19.2 provides some practice in calculating forward-forward interest rates.

Next, we need to see exactly why forward-forward interest rates (often referred to as the implied repo rate) are important for interest rate futures prices. Consider the following set of actions of an arbitrageur:

- 1 S/he sells a futures contract requiring the delivery in three months' time of a bill maturing three months from the delivery date.
- 2 To allow him or her to deliver the required bill in three month's time, s/he buys a 180-day Treasury bill (yielding  $i_t$ ).
- 3 To pay for the Treasury bill, s/he borrows in the money market for three months (at  $i_s$ ).

No risk is involved here. At the end of three months, s/he settles the futures contract by delivering the Treasury bill s/he has been holding and uses the funds received to pay back the loan. All that is really going on is the purchase of a 180-day Treasury bill which is re-sold three months ahead. In a perfect market and with no transactions costs, all that our arbitrageur

**Exercise 19.2 Forward-forward interest rates**

US\$ LIBOR interest rates on 19 April 2004 were:

- one month 1.1%
- three months 1.15%
- six months 1.27%
- one year 1.58%

- 1 Calculate the forward-forward interest rates:
  - (a) for two months, one month ahead;
  - (b) for three months, three months ahead;
  - (c) for six months, six months ahead;
  - (d) for nine months, three months ahead.
- 2 What general conclusions can you come to about the relationship between spot interest rates and forward-forward rates, by comparing your answers with the spot rates for the different time periods in the USA and with the euro area example in the text?

should be able to ask for this bill in three months' time is the interest rate on three-month money three months ahead, that is, the three-month forward-forward interest rate three months from now. Since, in this example, the means used for carrying out the purchase and re-sale of the Treasury bill is the futures contract, that contract should be priced to yield the forward-forward interest rate. We have already seen that this is determined by the relationship between the spot rate of interest on money for six months and the spot rate of interest on three-month money. If the price of the futures contract were too high, yielding greater than the forward-forward rate, the arbitrage strategy above would produce a profit for the arbitrageur. On the other hand, if the yield on the futures contract were below the forward-forward interest rate, the reverse strategy would produce an arbitrage profit. Box 19.2 uses these rules to return to the question of the pricing of LIFFE Sterling futures raised in Box 19.1.

We can formalize the above argument as follows. From Equation 19.3, we have the price of a futures contract as:

$$P_f = P_s(1 + i - c) \tag{19.3}$$

Since we are dealing here with a bill, there is no return on the bill while it is being held and  $c = 0$ . Thus we have:

$$P_f = P_s(1 + i_s \cdot n_{sm}) = P_s + (i_s \cdot n_{sm})P_s \tag{19.8}$$

**Box 19.2 Pricing sterling interest rate futures**

In Box 19.1 we reported that the implied interest rates on three-month LIFFE sterling interest rate futures in March 2004 were June 4.42%; September 4.53%; December 4.62%; March 4.7%. We asked you to consider why these rates were consistently above the equivalent money market interest rates.

Using the formula in Equation 19.7, we can calculate the following forward-forward interest rates on sterling using the Libor interest rates given in Box 19.1:

Forward-forward rate

- (a) for two months one month ahead            4.34%
- (b) for three months three months ahead    4.46%
- (c) for six months six months ahead        4.61%

Using the rule that the *fair price* of a short-term interest rate future should be given by the relevant forward-forward interest rate, (a) should correspond approximately to the implied interest rate from the June forward contract price (4.42%); (b) to that implied by the September forward contract price (4.53%) and (c) to that implied by the March 2005 contract (4.7%). In fact, the forward-forward rates lie below the rates implied from the futures contracts, just as the market interest rates did, although they are closer to the rates given by the futures prices than are the money market rates.

Why might this have been so? Remember that the existence of transactions costs establishes a no-arbitrage band within which the prices of futures settle. Remember also that the price within this band at which prices do settle depends on expectations regarding the future price of the underlying asset – in this case interest rates on short-term deposits. Following a period of falling interest rates, UK official interest rates had begun to rise in November 2003, when the Monetary Policy Committee of the Bank of England increased its repo rate from 3.5 to 3.75%. A further increase of 25 basis points had followed in February 2004. Concerns about the speed of house price rises and increased personal indebtedness in the UK caused market analysts to believe that further increases were on the way. Thus, interest rate futures began to ‘price in’ interest rate rises expected later in 2004 and in 2005. In fact, the repo rate was raised by a further 25 basis points to 4.25% in May 2004. This expected increase in interest rates accounts for the implied rates from futures contracts lying above the fair price established by forward-forward interest rates.

where  $P_s$  is the spot price of the bill,  $i_s$  is the financing cost of holding the bill until the futures delivery date (three months in our example), and  $n_{sm}$  is the period to redemption expressed as a fraction of a year. We then need the expression for the spot price of the asset underlying the future. This is the six-month bill, held for three months and then delivered to meet the futures contract with three months to delivery. The price of this bill, expressed in terms of the interest rate rather than the discount rate can be written as:

$$P_s = \frac{M}{(1 + i_f \cdot n_{sm})} \tag{19.9}$$

where  $M$  is the par value and  $i_f$  is the interest rate on the bill. Making use of Equation 19.6 above, we can write this as:

$$P_s = \frac{M}{(1 + i_s \cdot n_{sm})(1 + i_f \cdot n_{sm})} \tag{19.10}$$

where  $i_f$  is the forward-forward interest rate from  $s$  to  $l$ .

Substituting Equation 19.10 into Equation 19.8 gives us:

$$P_f = \frac{M}{(1 + i_f \cdot n_{sm})} \tag{19.11}$$

and from Equation 19.7 above, we can write the fair price of our futures contract as:

$$P_f = \frac{M}{\frac{(1 + i_l \cdot n_{sm})}{(1 + i_s \cdot n_{sm})} - 1} \tag{19.12}$$

You will notice that this is different from what we do in Box 19.2 above where we have obtained a per annum interest rate implied by a futures price simply by subtracting the price from 100. This is, in fact, what futures exchanges do. Thus the expression for the fair price of futures becomes:

$$P_f = 100 - i_f$$

This may only be an approximation to Equation 19.12, but it does have the advantage of simplicity.

For a particular contract, say for three-month euro-dollar futures where the contract is for \$1 million, the fair price of the contract would be:

$$P_f = (100 - i_f) \cdot M/100 = (100 - i_f) \cdot \$1\text{m}/100$$

Of course, as in our general discussion above, the addition of transactions costs would introduce an element of freedom for futures prices. We would now have to say that the futures yield would have to be above or below the relevant forward-forward interest rate by more than necessary to meet transactions costs before arbitrage would be profitable. Also as in the general case, if we were to include a risk premium we could produce either backwardation or a contango.

To adapt this approach to long-term bond futures, we must allow for the coupon payments (thus  $c$  in Equation 19.3 is positive rather than being zero as it is with short-term interest rate futures). This has the effect of lowering the net financing cost associated with an arbitrage operation although the amount paid for the asset will be higher than in the short-term interest rate futures case since the bond must be purchased at face value, rather than at a discount. We must also take into account the complications on delivery noted in Section 19.3. Suppose the futures contract has a delivery date three months ahead and is for a notional 20-year bond. The **cash-and-carry** arbitrage operation does not require the arbitrageur to buy now a bond which will, in three months' time, have 20 years to run to maturity. Rather, s/he will buy now the cheapest-to-deliver bond that will satisfy the contract. S/he must therefore borrow funds at money market rates to buy this bond and will pay the dirty price for it. The cost of carry will be given by the dirty price of the bond times the money market interest rate less the amount of accrued interest on the bond over the three months to the delivery which will depend on the coupon of the CTD bond. To establish the fair price of the notional bond, we must then divide by the price factor ( $PF$ ) on the CTD bond. We can modify Equation 19.3 to:

$$P_f = \frac{P_s}{PF} (1 + i \cdot n_{sm} - c \cdot n_{sm}) \frac{P_s}{PF} \quad (19.13)$$

Again, an actual futures price may vary from the fair price because of transactions costs and the incorporation of a risk premium.

### 19.4.3 Pricing currency futures

Establishing the fair price of a currency future is simply an exercise in covered interest rate parity. Assume a British firm needs euro in three months' time (it is short in euro) and it wishes to lock in the existing £/€ exchange rate (hedging against the risk that the pound would weaken over the following three months). It could do this by purchasing a futures contract on euro with a delivery date three months ahead (or it could buy euro forward). Alternatively, it could borrow for three months in sterling at UK interest rates, convert the funds borrowed into euro at the existing spot exchange rate and invest the euro at euro area interest rates for three months. At the end of the period, it would collect the euro from its investment, meet its obligations in the euro area, and repay its sterling loan.

These two strategies produce the same results and thus the fair price of the futures contract should depend on the spot exchange rate and the difference between interest rates in the UK and the euro area. As we demonstrate in Box 19.3, we can write the fair price of the currency future by rewriting Equation 18.4 as:

$$\frac{P_f - E_s}{E_s} = \frac{i_d - i_f}{1 + i_f} \quad (19.14)$$

where  $P_f$  is the price of the futures contract. In our example above  $i_d$ , the domestic interest rate, is the pound,  $i_f$  the euro rate and  $E_s$  the exchange rate of sterling expressed in direct quotation.

This may be approximated as:

$$\frac{P_f - E_s}{E_s} = i_d - i_f \quad (19.15)$$

Therefore, the fair price of a currency futures contract is the same as the price of the equivalent forward contract under conditions of interest rate parity. There will be differences between forward and futures prices when allowance is made for the margins payments under futures contracts and the interest forgone on margin payments. It must also be remembered, however, that traders wishing to buy foreign currency forwards from banks will be required to maintain deposits with the bank to insure the bank against default risk, and so the differences between forward and futures prices are likely in practice to be very small.

**Box 19.3 The fair price for currency futures and covered interest parity**

Assume a UK firm needs €1 million in three months' time to pay for goods already ordered from a German firm. It sets out to lock in the current exchange rate, using spot markets only. Thus, it will need to invest in the euro area:  $€1m/(1 + i_e)$  where  $i_e$  is the spot interest rate in the euro area. Assuming this to be 2.5 per cent, it will require €993,789.

To obtain this, it will need to convert into euro  $£[1,000,000/(1 + i_e)] \cdot E_s$  where  $E_s$  is the spot exchange rate of sterling in direct quotation. Assume this to be:  $€1 = £0.6694$ . That is, it will need to convert £665,242 into euro. It borrows this amount at UK interest rates and at the end of the three months must repay this amount plus interest:

$$\{[€1,000,000/(1 + i_e)] \cdot E_s\} \cdot (1 + i_e)$$

With UK interest rates at 4.5 per cent, this will amount to £672,726. Thus, the effective exchange rate obtained for the transfer of funds will be  $£672,726/1,000,000 = €1$  or  $£0.6727 = €1$ .

We have omitted transactions costs here and so can assume that this should be the fair price of a currency future for the delivery of euro three months ahead. That is,

$$P_f = \{[€1,000,000/(1 + i_e)] \cdot E_s\} \cdot (1 + i_e)$$

We may generalize the equation by letting:

$$i_e = i_d; i_e = i_f \text{ (domestic and foreign interest rates respectively)}$$

and  $€1,000,000 = 1$  (contract). Then:

$$P_f/E_s = (1 + i_d)/(1 + i_f)$$

which we may rearrange and write as:

$$(P_f - E_s)/E_s = (i_d - i_f)/(1 + i_f) = i_d - i_f$$

which is the covered interest parity condition.

**19.4.4 Equity index futures prices**

The general rules apply also to the pricing of equity index futures and we could reproduce Equation 19.3, with  $c$  now being the dividend yield on shares held. However, a number of complications can be seen when the nature of the cash-and-carry arbitrage strategy is considered. Let us take the steps involved in the similar strategy for short-term interest rate futures listed in Section 19.4.1 and observe the differences.

- (a) The arbitrageur sells a futures contract requiring the delivery in three months' time of the stock exchange index. But an index cannot be delivered. Rather, stock exchange index futures are settled on the delivery date by cash payments reflecting the change in the value of the index over the period of the contract. Thus, the risk to the seller of the index is that the share price index will have risen during that time.
- (b) To remove this risk of having to make a cash payment, the arbitrageur would need to construct, at the beginning of the period, a portfolio of all the shares in the stock exchange index in question, in the exact proportions used in the calculation of the index. The portfolio would be held until the delivery date of the futures contract and then sold in its entirety. The portfolio of shares would rise in value in the exact proportion as the index and the cash profit on the shares could be used to meet the required cash payments under the futures contract. The purchase of the shares would have the extra bonus that dividends would be received while the shares were being held and the fair price of the futures contract would be lower to this extent.
- (c) To pay for the portfolio of shares, the arbitrageur borrows in the money market for the period of the contract.

Now consider the problems in step (b). Firstly, it would be impossible to construct the required portfolio instantaneously at the beginning of the period and thus prices might move against the arbitrageur while the portfolio was being constructed. That is, share prices might begin to rise, making it more expensive to acquire the required portfolio. Secondly, it is likely to be very difficult, if not impossible, to build up a portfolio exactly the same as that used in the calculation of the index. Given stock exchange rules regarding the minimum size of parcels of shares, a portfolio that exactly represented the index might need to be very large. To the extent that the portfolio held was different from the notional portfolio used to calculate the index, the level of systematic or market risk associated with the portfolio might be different from that of the index. Hence it is not possible to have a genuinely risk-free arbitrage strategy in the case of stock exchange indices. In addition, the transaction costs associated with acquiring the necessary shares would be likely to be much higher than they would be if purchasing a single bill or bond in the cash market. Therefore, the no-arbitrage band is bound to be much wider in the case of stock exchange index futures.

Finally, the dividend payments cause complications because, unlike bond coupon payments, they will not occur regularly throughout the period during which the shares are held and their size will be uncertain. This makes futures prices more volatile than the index itself. Suppose a number of dividend payments on the shares are bunched together. As soon as they are paid, the benefits of acquiring the representative portfolio of assets will fall (in terms of Equation 19.3,  $c$  will fall sharply) and the fair price of the futures will rise sharply. Meanwhile the index, which does not take dividend payments into account, will remain unaffected.

## 19.5 Summary

Risks facing firms have increased in a number of ways as they have become bigger and more international in nature and as exchange rates have become more volatile and future inflation rates more uncertain. To help counter these risks, new markets have grown up in financial derivatives – contracts to exchange based upon the performance of separately traded financial instruments. As part of this growth, financial futures markets have developed in which standardized contracts on short- and long-term interest rates, foreign exchange rates and stock exchange indices are traded on specialized exchanges. To reduce default risk and increase the tradability of futures, clearing houses have been established which take over counterparty obligations on all contracts. Exchange members must keep accounts with the clearing house, which are adjusted daily to reflect profits and losses on all contracts. This system of margin payments means that futures are highly geared. Although very few exchanges of the underlying instruments actually occur under futures contracts, the possibility that delivery might be required ensures that the prices of futures will be closely linked (although not identical) to the prices on the cash markets through potential arbitrage strategies. These arbitrage strategies allow the fair price of futures – the price that provides the risk-free rate of profit – to be calculated. This rate of profit will always equal the net cost of carry, the net cost of holding the underlying instrument for the duration of the futures contract. In practice, transaction costs create a no-arbitrage band within which the price of the futures must lie and the actual futures price may vary from the fair price to include a risk premium. The basic fair pricing rule can be modified to suit the particular characteristics of the different types of financial futures.

### Key concepts in this chapter

Derivatives	Cost of carry	Limit-up/Limit-down
Open outcry	Contango	Settlement price
Initial margin	Backwardation	Open interest
Marked to market	Normal backwardation	Cash and carry strategy
Margins	Financial futures	Basis
Price factor	Clearing house	Normal contango
Fair price	Variation margin	Forward-forward interest rates



## Questions and problems

- 1 Explain each of the following:
  - (a) the role of a clearing house in a futures market;
  - (b) the potential advantages and risks of trading on margin in futures markets;
  - (c) contango;
  - (d) normal backwardation.
- 2 Outline the relative advantages and disadvantages of each of the following as instruments for providing protection against foreign exchange risk:
  - (a) forward foreign exchange markets;
  - (b) futures contracts in foreign exchange.
- 3 What are the characteristics of futures and futures exchanges which serve to increase the tradability of futures?
- 4 Money market interest rates on the Danish krone on 23 April 2004 were:
 

one month 2.1	three months 2.1
six months 2.15	one year 2.25

 Calculate the forward-forward interest rates:
  - (i) for two months, one month ahead;
  - (ii) for three months, three months ahead;
  - (iii) for six months, six months ahead;
  - (iv) for nine months, three months ahead
- 5 You are given the following information:
 

Spot euro interest rates on three-month money: 2.05 per cent

Spot US interest rates on three-month money: 1.17 per cent

\$/€ exchange rate: \$1.1825 = €1

  - (a) Calculate the fair price for a euro futures contract with a delivery date three months ahead.
  - (b) Why might the actual futures price differ from the fair price?
  - (c) Describe the arbitrage strategy which would produce a profit if the actual futures price was (i) above the fair price, (ii) below the fair price.
- (d) Allow for transactions costs of 2 per cent of the value of the contract and calculate the no-arbitrage band for the futures price.
- 6 In Section 19.4.2 above, we write:
 

If the price of the futures contract were too high, yielding greater than the forward-forward rate, the arbitrage strategy above would produce a profit for the arbitrageur. On the other hand, if the yield on the futures contract were below the forward-forward interest rate, the reverse strategy would produce an arbitrage profit.

Outline the reverse strategy referred to here.
- 7 Assume that at the end of March 2005, three-month Euribor futures offered by Eurex stood at:
 

Jun 98.02	Sep 97.98	Dec 97.90
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 What term would you use to describe this relationship between futures contracts of different periods? What is the opposite situation? What might the above set of figures imply that hedgers were using short-term interest rate futures to achieve?
- 8 You are given the following figures for the end of September:
 

Spot dirty price of cheapest to deliver long gilt = £97.25

Price factor of cheapest to deliver long gilt = 0.9815625

Sterling money market interest rate for three months = 4.29 per cent

Coupon rate on the cheapest to deliver long gilt = 8 per cent

Calculate the fair futures price for the December long gilt contract.
- 9 Why is so much attention given to the form of delivery of the underlying product on futures contracts when delivery hardly ever occurs?

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## Chapter 20

# Options, swaps and other derivatives

### *What you will learn in this chapter:*

- The nature and uses of options
- How to read options tables in the *Financial Times*
- The factors determining options prices
- The nature and uses of swaps
- The advantages of different kinds of financial derivatives
- The advantages and disadvantages of financial derivatives in general

## 20.1 Introduction

Two other instruments whose use has grown rapidly in financial markets in recent years have been options and swaps. Both instruments help firms hedge risk but both have also become associated with speculation and spectacular financial disasters. In this chapter we look at the nature of these instruments and also at the advantages and disadvantages of derivatives generally. From Sections 20.2 to 20.5 we look at the use of and the pricing of options. Section 20.6 deals with swaps while Section 20.7 compares the different types of derivatives and Section 20.8 considers issues associated with derivatives generally.

## 20.2 Options

An option gives the right to buy or sell a given amount of a financial instrument or commodity at an agreed price (known as the **exercise** or **strike price**) within a specified time, but does not oblige investors to do so. Just as with futures, options contracts are drawn up between two counterparties, the purchaser and the writer (seller) of the option. They may be registered with and traded through a futures and options exchange or may be arranged over-the-counter (OTC) between the two counterparties. Options contracts are offered both on cash securities (short- and long-term interest rates, exchange rates, equities of individual companies, and stock exchange indices) and on other derivatives contracts. For options on cash securities (premium paid options), the buyer pays the full price or **premium** of the option at the time of purchase. For options on derivatives contracts (premium margined options), buyers and sellers are margined and marked to market in the same way as with futures.

OTC options (non-tradable, custom-made options constructed by banks for their customers) make up a high proportion of the total value of options sold. Traditional options which are also not tradable continue to exist in stock markets. The major developments in recent years have been the large increase in the number of specialized futures and options exchanges, the development of increasing numbers of traded options contracts and the growth of **exotic options** tailored to the specific needs of investors.

The buyer of a **call option** acquires the right to buy the specified instrument. For example, an investor who thinks that the euro will rise against the US dollar could buy a  $\$/\text{€}$  option, giving the right to buy euro at a specified price, say  $\$1.20 = \text{€}1$ . The holder of the option then has the right to acquire euro at that price at any time during the life of the option and is thus in a position to benefit from a rise in the spot price of the euro. If the spot exchange rate were to rise to  $\$1.25 = \text{€}1$ , the option holder could acquire euro at  $\$1.20$  under the terms of the option and sell them in the spot market at  $\$1.25$ . The buyer of a call option thus assumes a long position in the underlying instrument (in this case euro). As the price of the underlying instrument rises, so too will the profit that can be made from exercising the option. Consequently, the premium that must be paid to acquire the option rises and this allows the holder of a call option to realize his or her profit by selling the option on, rather than by exercising it. If the option did not rise as the price of the underlying asset rose, there would be a profitable arbitrage opportunity. Box 20.1 provides a more detailed example relating to interest rate options.

The buyer of a **put option** acquires the right to sell and thus assumes a short position in the specified instrument. That is, the buyer of a put option stands to gain from a *fall* in the price of the underlying asset. Therefore, someone who buys a put option at  $\$1.20 = \text{€}1$  will be hoping that the value of the euro will fall below that level. They will then be able to buy euro in the spot market at, say  $\$1.15 = \text{€}1$  and then exercise the option in order to sell the euro at  $\$1.20$ . In this case, as the euro falls, the profitability of a put option in euro will rise and the premium that other investors are prepared to pay in order to acquire such an option will increase. As above, the holder of the put option may realize his or her profit by selling the option on, rather than by exercising it.

Just as in the futures market, the holder of an option sells it (closes out his or her market position) by entering into a reversing contract. That is, in the first case above in which we assumed that the euro was rising, a holder of a call option in euro 'sells' the option by writing (that is, selling) a call option on the same instrument for the same expiry date, in effect cancelling his or her right to buy euro. However, the increase in the price of the euro will have meant that the premium received for the sale of the call option will be greater than the premium paid on the initial call option.

**Box 20.1 Arbitraging between the cash and options markets**

Assume that the strike price of a three-month American option on a short-term interest rate (a three-month bank deposit) is 95; the premium is 0.25 per cent of the specified amount of the deposit which is £100,000. Thus, if the option is exercised, the writer of the option will pay the buyer interest on £100,000 for three months at a rate of 5 per cent p.a. (£1,250); the premium paid for buying the right to this payment is £250. The market rate of interest on the type of deposit specified is 5 per cent. The option is then said to be *at-the-money* – the value of the right granted by the option is equal to the market value of the underlying instrument. The current value of the option (the option's **intrinsic value**), the profit available from exercising it, would be zero. The buyer of the option could obtain from a prime bank exactly the same interest as is available from exercising the option.

Underlying deposit:	£100,000
Strike price:	95 (implying 5% p.a. interest rate)
Market rate of interest:	5% p.a.
Intrinsic value of option:	£0
Premium:	0.25% of underlying deposit = £250
Period to expiry:	Three months

Traders might still buy this option because the option grants the buyer more than the intrinsic value since interest rates might fall and the intrinsic value of the option rise before the expiry date. This right to benefit from a future rise in the price of an instrument is known as the option's **time value**.

Assume next that one month later (the option still has two months to expiry date), the current market rate of interest falls to 2 per cent but that the premium on the option does not change. The option holder could then exercise the option and receive £1,250 from the writer when a deposit of £100,000 with a bank (the alternative) would yield only £500. The option would be *in-the-money* – the value of the right granted by the option is greater than the market value of the underlying instrument and it would be profitable to exercise the option. We would have:

Underlying deposit:	£100,000
Strike price:	95
Market rate of interest:	2% p.a.
Intrinsic value of option:	£750
Premium:	0.25% = £250
Period to expiry:	2 months

Clearly, large numbers of traders would wish to buy this option but no one would be willing to write it since a writer would have to pay a much higher rate of interest than was available to them on an equivalent deposit. The premium would have to rise *at least* to 0.75 per cent of the underlying deposit. Of course, it might rise higher because of the time value remaining to the option holder – the possibility that the market interest rate might fall further in the following two months.

Had the interest rate risen above 5 per cent in this case, an option with a strike price of 95 would have been *out-of-the-money*.

The example of a call option given above states that the option can be exercised at any time during its life up until (and including) the expiry date. Such an option is known as an **American option**. There exist also **European options** which give holders the right to exercise the option on the expiry date only. Most traded options are American options.

Like futures contracts, few options produce a delivery of the underlying asset because profitable market positions are generally closed out before expiry while unprofitable options are left to lapse, with the

buyer losing only the premium. Therefore, the profit for most buyers of options is given by the change in the option premium between its purchase and sale. Options, then, like futures, give traders the opportunity to speculate on the likely direction of a market without actually trading in that market.

For hedgers who are short in the underlying asset, a call option establishes a maximum price for it:

- if the price in the cash market rises, the hedger may exercise the option at the lower strike price; or

- pay the higher price for the instrument in the cash market but set against this the profit obtained from selling the option.

However, if the spot market price falls, the hedger obtains the benefit of the fall and has only to set against this the premium paid for the option. Thus, the option provides protection from the spot price moving in one direction, without removing the profits that might arise if the price moves in the opposite direction. This is not the case in trading in other derivatives contracts. The reverse arguments hold for hedgers who are long in the underlying asset. For them, a put option establishes a minimum price for the underlying asset. If the spot price falls, the premium of the put option rises and the holder may either exercise the option at the strike price (preventing a loss) or sell the underlying asset at the lower spot price and sell the option in order to offset the loss incurred in the spot market. If the spot price rises, the holder of the option can benefit from the higher price in the cash market and allow the option to lapse. Thus, holding a long position in the cash market and buying a put option produces the same result as does buying a call option when the trader has no position in the cash market – in both cases, the holder of the option benefits from a rise in the price of the instrument in the cash market. For this reason the combination of being long in an instrument and holding a put option is sometimes known as a **synthetic call option**.

Whether a trader chooses an outright derivatives contract (such as a future) or an option will depend on what he thinks is likely to happen to the price of the underlying asset and on his attitude towards risk. A trader who has a long position in the cash market and who is convinced that the price of the instrument in question will not fall may well choose not to hedge at all. If he is certain that the price will fall, he may either sell the instrument or take an offsetting short position by selling forwards. This eliminates entirely his exposure to the price fall. The trader is only likely to choose options if he is uncertain in which direction the price will move. Even then, if he thinks that the price is more likely to fall than to rise, outright forward contracts are preferable to options. Options are preferable if the trader has no view or thinks that the price is more likely to rise than fall. Many mixed strategies are possible. Box 20.2 sets out some examples.

Options are highly geared (leveraged) because the options price is only a small percentage of the price of the underlying asset. In the example in Box 20.1,

the buyer of the call option may have made a profit of £750 for an outlay of only £250 in one month – a net per annum profit rate of 2,400 per cent.

Although it carries a considerable risk, a trader may prefer to hedge or speculate by writing options rather than buying them. Writing a call option offers protection against a price fall since in this case the option will not be exercised and the writer will collect the premium on the option. In the same way, writing a put option offers protection against a price rise. Writing options is only effective, however, if the price changes are relatively small and it carries the risk that if prices go against the writer, the loss may become very large. For example, a trader who writes a call option on the \$/€ exchange rate at a strike price of \$1.20 agrees to sell euro at that price. If the euro increases in value and the writer is short in euro, s/he will need to acquire them in the spot market at the higher price and the amount s/he loses will depend on the size of the contract (€100,000) and the amount the price rises. If the euro rose to \$1.21, the loss would be \$1,000 ( $100,000 \times \$0.01$ ); if it rose to \$1.26, the loss to the writer would be \$6,000 ( $100,000 \times \$0.06$ ) and so on. The writer cannot abandon a losing option in the way that the buyer can.

The trading of options contracts on organized exchanges guards against the risk that the writer of an option might default on it by not being able to deliver the underlying asset to the holder of a call option or to accept it from the holder of a put option. To buy an option, a trader must have an account with a brokerage firm holding a membership on the options exchange. The buyer pays for the option at the time of the trade and no other payments are required apart from a commission to the broker. However, because the writer of an option enters into an open-ended commitment, s/he may need large financial reserves to meet his or her obligations and the broker may require financial guarantees from option writers. A writer may write a **covered call** (the writer already owns the underlying asset and deposits it with the broker) or a **naked call**. In the latter case, the broker may require from the writer substantial deposits of cash or securities to ensure that s/he is able to meet his or her commitment. As in a futures market, the buyer and writer of an exchange-traded option have no obligations to a specific individual but to the clearing house of the exchange that manages the exercise process and the standardization of contract terms. This is not the case with OTC options where the relationship between buyer and writer is direct.

**Box 20.2 Mixed strategies in options trading**

It is possible to combine call and put options and the buying and writing of options to try to profit from expected conditions in the market. Some such options are:

**A. Cases where a trader either buys or writes options but does not do both**

*straddle* – a call + a put at the same strike price and expiry date

*strangle* – a call + a put for the same expiry date but at different strike prices

*strap* – two calls + one put with the same expiry dates; the strike prices might be the same or different

*strip* – two puts + one call with the same expiry date; again strike prices might be the same or different

In general, the buyer of these options is hoping for market prices to move sharply but is uncertain whether they will rise or fall. The buyer of a strap will gain more from a price rise than from a price fall; the buyer of a strip will gain more from a price fall. The writer in all four cases is hoping that the market will remain stable with little change in price during the life of the option.

**B. Spreads: Combinations of buying and writing options**

*butterfly* – buying two call options, one with a low exercise price, the other with a high exercise price + writing two call options with the same intermediate strike price or the reverse

*condor* – similar to a butterfly except that the call options which are written have different intermediate prices

Both a butterfly and a condor are *vertical* spreads – all options bought or sold have the same expiry date but different strike prices. *Horizontal* spreads have the same strike prices but different expiry dates. With *diagonal* spreads both the strike prices and the expiry dates are different.

Other mixed strategies have equally improbable names. They include: vertical bull call; vertical bull spread; vertical bear spread; rotated vertical bull spread; and rotated vertical bear spread.

**20.3 Reading the *Financial Times***

The *Financial Times* provides information on the trading of a number of different options contracts. Table 20.1 shows details of three different short-term interest rate contracts, one offered by CME, the other two by LIFFE. The size of the deposit underlying each contract is given at the top of each table (\$1 million, €1 million, £500,000). The various strike prices are shown down the left-hand side of each table. The strike price is quoted in the same way as are short-term interest rate futures, with the interest rate offered on the deposit in question being subtracted from 100. Thus, traders interested in Euribor options were offered contracts on four different interest rates: 2.25 per cent, 2.125 per cent, 2 per cent and 1.875 per cent. All three options had expiry dates at the end of each month. Premiums of call and put options are quoted for each strike price and time period. Premiums are generally quoted as a percentage of the

contract value but may also be quoted in points, with each point representing a given unit of currency (see, for example, Box 20.3).

In the case of short-term interest rate options, the option's price rises when the market interest rate

**Exercise 20.1**

Consider Table 20.1, which relates to 15 March 2004. One-month, three-months and one-year Euro Libor interest rates on that day were 2.053, 2.052, and 2.073 per cent respectively.

- 1 Why were the premiums for June calls on Euribor options higher than for puts for all but the highest strike price?
- 2 Why were the premiums for June calls so much higher than for April calls?
- 3 What do the premiums on short sterling options tell you about sterling interest rates on 15 March?

Table 20.1 Interest Rate Options

■ THREE MONTH EURODOLLAR OPTIONS \$1m (CME)							
Strike price May 15	CALLS			PUTS			
	Mar	Apr	May	Mar	Apr	May	
98.75	0.14	0.08	0.10	–	0.02	0.03	
98.875	0.02	0.01	0.02	–	0.07	0.08	
99	–	–	0.01	0.11	–	–	
99.125	–	–	–	–	–	–	

Prev day's data: volume, 177,902; calls, 46,707 puts, 224,609; open interest, 9,891,358. Source: Reuters/CME.

■ EURIBOR OPTIONS (Euronext.liffe) €1m 100-rate								
Strike Price	CALLS				PUTS			
	Mar	Apr	May	Jun	Mar	Apr	May	Jun
97750	0.200	0.265	0.265	0.275	0.000	0.000	0.000	0.010
97875	0.075	0.145	0.150	0.160	0.000	0.005	0.010	0.020
98000	0.000	0.045	0.060	0.080	0.050	0.030	0.045	0.065
98125	0.000	0.010	0.025	0.040	0.175	0.120	0.135	0.150

Est. vol. total, Calls 81128 Puts 28220. Previous day's open int., Calls 7026848 Puts 2441097.

■ SHORT STERLING OPTIONS (Euronext.liffe) £500,000 100-rate						
Strike Price	CALLS			PUTS		
	Mar	Apr	May	Mar	Apr	May
95375	0.355	0.220	0.230	0.000	0.015	0.025
95500	0.230	0.115	0.135	0.000	0.035	0.055
95625	0.105	0.045	0.065	0.000	0.090	0.110
95750	0.005	0.010	0.025	0.025	0.180	0.195
95875	0.000	0.000	0.010	0.145	0.295	0.305
96000	0.000	0.000	0.005	0.270	0.420	0.425

Est. vol. total, Calls 48026 Puts 12375. Previous day's open int., Calls 2012908 Puts 787655.  
Source: *Financial Times*, 16 March 2004.

falls since the exercise of the option would deliver to its holder a rate of interest higher than the market interest rate. Below each table the number of contracts traded the previous day and the total number of contracts outstanding (open interest) is provided. Exercise 20.1 asks you to consider the significance of some of the premiums quoted in Table 20.1.

Table 20.2 provides information on three currency options offered by CME – \$/€, \$/yen and \$/£.

All currency options are for the US dollar against a non-dollar currency and a call option gives the right to buy the non-dollar currency. Exercise prices are stated in US cents. Thus, the strike price of 1.2100 on the \$/€ contract is an exchange rate of  $\$1.21 = \text{€}1$ ,

the direct quotation of the dollar. The holder of a call option gains if the non-dollar currency rises in value. On 15 March (the day to which the tables refer) the spot exchange rate of the dollar against sterling was  $\$1.795 = \text{£}1$ . Thus, options with strike prices of \$1.80 and above were out-of-the-money, accounting for their low call premiums. Put options for the same strike prices were, of course, in-the-money since holders of put options would have been able to buy sterling on the cash foreign exchange market at \$1.795 and then claim the option to sell it at \$1.80 or above, depending on the contract strike price. This accounts for the fall in call premiums and the rise in put premiums as the strike price rises. That is, the *intrinsic*



Table 20.2 Currency options

■ US \$/€ OPTIONS (CME)						
Strike price Mar 15	CALLS			PUTS		
	Apr	May	Jun	Apr	May	Jun
<b>12100</b>	2.08	–	3.14	0.89	1.72	2.12
<b>12200</b>	1.63	2.17	2.88	1.34	2.08	2.53
<b>12300</b>	1.04	1.72	2.26	2.19	2.80	3.26
<b>12400</b>	0.92	1.34	1.87	2.86	3.41	3.86

Previous day's data: volume, 2,476; calls, 1,433 puts, 3,909; open interest, 51,772. Source: Reuters/CME.

■ US \$/YEN OPTIONS (CME)						
Strike price Mar 15	CALLS			PUTS		
	Apr	May	Jun	Apr	May	Jun
<b>8900</b>	–	–	2.61	0.23	0.51	0.71
<b>9000</b>	1.38	1.74	1.97	0.47	0.83	1.06
<b>9100</b>	0.80	1.18	1.43	0.89	1.27	1.52
<b>9200</b>	0.44	0.78	1.04	1.53	1.87	2.13

Previous day's data: volume, 270; calls, 565 puts, 853; open interest, 35,834. Source: Reuters/CME.

■ US \$/UK£ OPTIONS (CME)						
Strike price Mar 15	CALLS			PUTS		
	Apr	May	Jun	Apr	May	Jun
<b>1790</b>	–	–	3.34	2.36	–	3.70
<b>1800</b>	1.45	2.53	3.09	2.91	3.70	4.26
<b>1810</b>	1.36	–	–	3.53	–	–
<b>1820</b>	0.91	1.80	2.31	4.27	4.96	5.47

Previous day's data: volume, 1,115; calls, 431 puts, 1,546; open interest, 12,509. Source: Reuters/CME.  
Source: *Financial Times*, 16 March 2004.


*value* of the call option is lower and that of the put option higher as the strike price rises. The intrinsic value is negative for out-of-the-money options but the premiums remain positive because of the *time value* possessed by an option (see Box 20.1).

The increase in the premium of both calls and puts for any one strike price as the length of time to expiry increases, reflects the greater time value possessed by options that have more time to expiry. Thus, the highest premium shown for the \$/£ option in Table 20.2 (5.47 for a June put) arises both because the option was already in-the-money and because it had three months to run till expiry during which time the value of sterling might have fallen in the cash market. The \$/€ exchange rate in the foreign exchange market on 15 March 2004 was \$1.225 = €1, meaning that call

options with strike prices of \$1.21 and \$1.22 were in-the-money while put options with a strike price of \$1.23 and \$1.24 were in-the-money.

Table 20.3 shows details of three options on notional US, Japanese and German government bonds offered by the Chicago Board of Trade (CBOT), the Tokyo Stock Exchange (TSE) and Eurex respectively. However, the Euro Bund Option offered by Eurex is actually an option on the separate Euro Bund Future contract offered by Eurex. That is, the underlying instrument is a futures contract offered by Eurex on a notional long-term debt instrument issued by the German Federal Government with a remaining term of 8½ to 10½ years and a 6 per cent coupon. The exercise of the option creates a corresponding Euro Bund futures position for both purchaser and seller.

Table 20.3 Bond options

■ US TREASURY 10 YEAR OPTIONS \$100,000 (CBOT) 						
Strike price Mar 15	CALLS			PUTS		
	Apr	May	Jun	Apr	May	Jun
<b>116</b>	0–28	0–62	1–19	0–47	1–17	1–38
<b>117</b>	0–10	0–36	0–55	1–29	1–55	–
<b>118</b>	0–03	0–19	0–35	2–22	–	2–54
<b>119</b>	0–01	0–09	0–20	–	–	–

Prev day's data: volume: 62,579; calls: 84,755 puts: 147,334; open interest, 2,233,017. Source: Reuters/CBOT.

■ 10 YEAR JAPANESE GOVT BOND OPTIONS (TSE)						
Strike price Mar 15	CALLS			PUTS		
	Apr	May	Jun	Apr	May	Jun
<b>1390</b>	0.53	0.57	1.09	0.37	0.71	0.92
<b>1395</b>	0.24	0.57	–	0.50	–	–
<b>1400</b>	0.09	0.35	0.50	–	–	1.34
<b>1405</b>	0.03	0.21	–	–	–	–

Calls: 2,286 Puts: 4,047. Volume: 6,333. Previous day's Open Interest: 33,982. Source: Reuters/TSE.

■ EURO BUND OPTIONS B100,000 (Eurex)						
Strike price Mar 15	CALLS			PUTS		
	Apr	May	Jun	Apr	May	Jun
<b>115.5</b>	0.80	–	–	0.13	–	–
<b>116</b>	0.46	0.93	1.16	0.27	0.66	0.98
<b>116.5</b>	0.28	0.56	0.93	0.50	–	–
<b>117</b>	0.09	–	0.67	–	–	–

Calls: 36,758 Puts: 18,049. Volume: 54,807. Previous day's Open Interest: 981,252. Source: Reuters/Eurex.  
Source: *Financial Times*, 16 March 2004.

You should note that in all three cases the option premiums for calls falls as the strike prices increase, indicating that the market expected interest rates to rise and, hence, bond prices to fall in the near future.

Table 20.4 shows options on four stock exchange indices:

- on the Financial Times Stock Exchange Index of the share prices of the 100 largest companies quoted on the London Stock Exchange (FTSE 100), offered by Euronext.Liffe);
- on the German DAX (offered by Eurex);
- on the Japanese Nikkei 225, offered by the Osaka Securities Exchange (OSE); and
- on the American Standard and Poor's 500, offered by the Chicago Mercantile Exchange (CME).

The FTSE index option is organized with strike prices along the top and expiry dates down the left-hand side. The reverse is done for the other three contracts shown. Box 20.3 shows the major points of the contract specification for the Eurex option on the DAX stock exchange index. As is indicated in these specifications, this is a European-style option. That is, it can be exercised only on the expiry date, not at any time during the life of the option as with American options. The premiums for options on stock exchange indices are calculated in terms of index points not as a percentage of the contract value.

With all four options one can again see that the premium on both calls and puts rises as the period to expiry lengthens. Equally, the premium on calls falls and that on puts rises as the strike price increases.

Table 20.4 Stock index options

■ FTSE 100 INDEX OPTION (Euronext.liffe) £10 per full index point

26 Apr



	4225		4325		4425		4525		4625		4725		4825		4925	
	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P
May	349½	4½	252	7	160	14½	79½	33½	26	79½	5½	159	1	254	¼	353
Jun	365½	15½	273	22½	185½	34½	109½	58	52½	100	21	168	6½	253	1½	347½
Jun	391	29½	301½	40	216½	55	143½	82	81½	120	40	178½	17½	256	7	345½
Aug	401½	48	316	62½	236½	83	166	112½	107	153½	63½	210	33½	280	16	362½
Sep	422½	65	339½	80½	262	101½	192	130	131½	168	83	218	48	281	25	356½

Calls 9,615; Puts 11,934. \*Underlying index value. Premiums shown are based on settlement prices.

■ DAX INDEX OPTIONS (Eurex)

Strike price	CALLS				PUTS		
Apr 26	Jun	Sep	Dec	Jun	Sep	Dec	
4100	143.2	254.8	327.8	100	184.5	232	
4150	113	–	–	110.5	192.3	–	
4200	88	193	268	144	214	–	

Calls: 67,285 Puts: 75,869. Volume: 143,154. Previous day's Open Interest: 4,119,747.

Source: Reuters/Eurex.

■ NIKKEI 225 OPTIONS (Osaka)

Strike price	CALLS			PUTS		
Apr 26	May	Jun	Jul	May	Jun	Jul
11500	725	780	880	25	115	200
12000	305	440	545	125	280	380
12500	80	215	315	410	540	625
13000	10	90	165	–	–	–

Calls: na Puts: na. Volume: na. Previous day's Open Interest: na.

Source: Reuters.

■ S&P 500 INDEX OPTION (CME) \$10 per full index point

Strike price	CALLS			PUTS		
Apr 26	Jun	Sep	Dec	Jun	Sep	Dec
1120	36.60	55.60	–	17.20	37.10	–
1130	30.00	49.30	–	22.70	40.80	–
1140	20.70	43.50	58.70	24.50	44.90	60.50
1150	17.20	38.00	53.10	30.00	49.30	64.80
1160	12.00	33.00	48.00	35.00	54.30	–

Previous day's data: volume, 4,387; calls, 7,269 puts, 11,656; open interest, 292,616.

Source: Reuters/CME.

Source: *Financial Times*, 27 April 2004.

**Box 20.3 Major contract specifications for the Eurex DAX index option, April 2004****Underlying Instrument**

The Deutscher Aktienindex

**Contract Value**

EUR 5 per DAX index point.

**Settlement**

Cash settlement, payable on the first exchange trading day immediately following the last trading day.

**Quotation**

In points, carried out one decimal place.

**Minimum Price Movement**

0.1 of a point, representing a value of EUR 0.50.

**Last Trading Day**

The third Friday of the expiry month, if that is an exchange trading day; otherwise, on the exchange trading day immediately prior to that Friday.

Trading ceases at the start of the intra-day trading auction on the electronic trading system (Xetra) at 13:00 CET.

**Daily Settlement Price**

The last-paid price of the trading day; or, if the last-paid price is older than 15 minutes or does not reasonably reflect actual market conditions, then Eurex will establish the official settlement price.

**Final Settlement Price**

The value of the DAX, determined on the basis of the collective prices of the shares contained in the DAX index as reflected in the intra-day trading auction on the electronic system of the Frankfurt Stock Exchange (Xetra).

**Exercise Period**

European style, i.e. an option may only be exercised on the last trading day of the options series up to the end of the Post-Trading Period.

**Expiry Months**

The three nearest calendar months, the three following months within the quarterly cycle March, June, September and December thereafter, the four following months of the semi-annual cycle June and December thereafter as well as the two following months of the annual cycle December; i.e. options contracts are available with a duration of 1, 2, 3, 6, 9, 12, 18, 24, 30, 36, as well as max. 48 and 60 months.

**Exercise Prices**

Exercise price gradations for DAX<sup>®</sup> options are as follows:

Expiry Months with a remaining term up to	Number of strike prices	Exercise price gradations in index points
6 months	9	50
12 months	5	100
60 months	5	200

Each contract month will be introduced with at least five strike prices.

**Option Premium**

The EUR equivalent of the premium in points is payable on the first trading day immediately following the trade date.

Source: [www.eurexchange.com/download/rules/rules.specs.download.en.pdf](http://www.eurexchange.com/download/rules/rules.specs.download.en.pdf)

**Exercise 20.2**

At the close of the London Stock Exchange on 26 April 2004, the FTSE 100 index stood at 4571.8.

- Which of the options contracts on the FTSE 100 index shown in Table 20.4 were then in-the-money? Why?
- Explain the difference between the cost of a call option and a put option at a strike price of 4825.

**20.4 The pricing of options**

We have seen that the premium of an option on a given day consists of two elements: the *intrinsic value* – the profit that would be made by exercising the

option on that day; and the *time value* – a measure of the chances that the option will become profitable before the expiry date. We have seen above, in looking at contract premiums from the *Financial Times*, that one element of the time value of an option is just the length of time that an option has to run to expiry since the longer that period is, the greater must be the chance that the price of the underlying asset will change, affecting the profitability of the option. Options pricing is, however, rather more complicated than this suggests since the chances of a change occurring in an underlying price depend not only on the length of time but also on the volatility of the price in question. Where the underlying price has a high variance (that is, it changes frequently and by relatively large amounts), the time value of an option will be greater for each period to expiry than where the underlying price is generally relatively stable. It

**More from the web****European stock exchange indices**

Stock exchange indices are calculations made on an index number basis to indicate the movements in the general level of prices of securities listed on stock exchanges. The principal indices referred to in most countries are based on a selection of shares of listed companies, usually the largest listed companies measured by market capitalization, the companies whose shares are traded most frequently (market turnover) or a combination of both. Here is a selection of European stock exchange indices.

Country	Index Name	Companies	Web Address
Austria	Austrian Traded Index (ATX)	21*	<a href="http://www.wienerboerse.at/cms">www.wienerboerse.at/cms</a>
Belgium	Brussels Stock Exchange Index (BEL-20)	20	<a href="http://www.stockexchange.be/enindex.htm">www.stockexchange.be/enindex.htm</a>
Denmark	Copenhagen Stock Exchange Index (KFX)	20	<a href="http://www.cse.dk/kf">www.cse.dk/kf</a>
Finland	Helsinki Stock Exchange 20 Index (HEX20)	20	<a href="http://www.hex.com/en/">www.hex.com/en/</a>
France	Compagnie des Agents de Change 40 Index (CAC 40)	40	<a href="http://www.euronext.com/home/">www.euronext.com/home/</a>
Germany	Deutscher Aktienindex (DAX)	30	<a href="http://www.deutsche-boerse.com/">www.deutsche-boerse.com/</a>
Italy	Milano Italia Borsa Index 30 (MIB30)	30	<a href="http://www.borsaitalia.it/">www.borsaitalia.it/</a>
Netherlands	Amsterdam European Options Exchange Index (AEX)	25	<a href="http://www.euronext.com/home/">www.euronext.com/home/</a>
Spain	General Index Bolsa de Madrid (IGBM)	c100	<a href="http://www.bolsamadrid.es/ing/portada.htm">www.bolsamadrid.es/ing/portada.htm</a>
Sweden	Stockholm Stock Exchange SX-16 Index (SX16)	16	<a href="http://www.xsse.se/">www.xsse.se/</a>
Switzerland	Swiss Market Index (SMI)	21	<a href="http://www.swx.com/top/index_en.html">www.swx.com/top/index_en.html</a>
United Kingdom	Financial Times Stock Exchange Index (FTSE100)	100	<a href="http://www.ft.com">www.ft.com</a> or <a href="http://www.londonstockexchange.com/">www.londonstockexchange.com/</a>

\*to rise to 30 when more companies become eligible.

is true that a volatile price may fall sharply as well as rise sharply but falls in price are relevant only to the point at which the option is at-the-money at the time of expiry – greater falls in price, making the value of the option negative at the time of expiry, will simply cause the option to be abandoned. It follows that sharp price movements upwards have a much stronger impact on the possible profitability of an option and also that volatility will always be positively related to the premium.

Further, the intrinsic value and time value are related. If an option is presently deeply out-of-the-

money (it has no intrinsic value), the chances that (for any given time period and volatility of the cash price) a change in price will make the instrument profitable must be less than if the option is only just out-of-the-money or at-the-money. Equally, if an option is deeply in-the-money, the chances that the cash price will go on rising, continuing to increase the profitability of the option, are less than if the intrinsic value of the option is lower. We can put this more formally as: the further the strike price is from the prevailing spot rate (the deeper in- or out-of-the-money the option is) the lower will be its time value as the risk-adjusted

probability of gain on the contract to the buyer declines. Box 20.4 discusses the relationship between time value and intrinsic value in the context of the European- and American-style options.

The value of a call option and hence the premium on it will also be higher, the higher is the risk-free rate of interest. This arises because of the choice which is always available to buy the underlying asset in the cash market as an alternative to buying an option. One advantage of the option is that only the premium needs to be paid and thus the difference between the cost of buying the asset directly in the cash market and the premium paid on the option is available to be invested. If we wish to make the two strategies comparable, the amount made available for investment by buying the option should be invested in a risk-free form, hence the use of the risk-free rate of interest. It follows that increases in interest rates will cause options to become more attractive relative to a direct purchase in the cash market. The value of the option and the premium paid for it increase with increases in the rate of interest.

We can sum up this discussion by saying that the premium of an option will, *ceteris paribus*, be:

- 1 positively related to the cash price ( $P_s$ ) of the underlying asset since increases in  $P_s$  increase the intrinsic value of the option;
- 2 negatively related to the strike price ( $P_x$ ) since decreases in the strike price increase the intrinsic value of the option;

- 3 positively related to the amount of time that the option has to run before expiry ( $n_m$ ) since the longer this period is the greater the time value of the option is;
- 4 positively related to the volatility of the cash price of the underlying asset since the greater the volatility of the cash price the greater is the chance that the cash price will rise to high levels before expiry (the higher the volatility, the higher the time value of the option); and
- 5 positively related to the risk-free rate of interest ( $i_r$ ) since the higher is the rate of interest the more attractive the option is relative to a purchase of the underlying asset in the cash market.

The next step is to establish the band within which an options price must fall if there are not to be profitable arbitrage opportunities. Consider the premium of an American call option. Even if it is deeply out-of-the-money, a call option must always have a positive value before expiry because there must always be some chance that the cash price will change sufficiently to give the option intrinsic value by the expiry date. At the point of expiry, however, the option could have zero value, in which case it would lapse. Thus:

$$Pm^c \geq 0 \quad (20.1)$$

where  $Pm^c$  is the premium of a call option.

However, it is also true that the premium of an American call option must be at least equal to its

#### Box 20.4 Premiums on European and American stock exchange indices

*European options* can only be exercised on the expiry date whereas *American options* can be exercised on any day up to and including the date of expiry. Thus, prior to the expiry date an American option has both intrinsic value and time value whereas a European option effectively only has time value. However, on the expiry date itself, European and American options have the same value – they both only have intrinsic value given by the difference between the strike price and the underlying price. There is no time left for the underlying price to change.

Remember also that short of the expiry date American options that are out-of-the-money have no intrinsic value and so, like European options, they only have time value. However, as we note in the text, the time value of the two types of option will differ because an out-of-the-money American option might acquire intrinsic value and be exercised prior to the expiry date. This cannot happen with a European option since it only has intrinsic value on the expiry date and so for options that are currently out-of-the-money, the premiums for American options should be higher than for European options. But how much higher?

Remember, too, from the text that for deeply out-of-the-money options, *ceteris paribus*, the chances that a change in price would make the option profitable are less than if the option were only just out-of-the-money or at-the-money. Thus, the difference between the time value and hence the premiums of European and American options should be smaller the more deeply out-of-the-money they currently are.

intrinsic value at any time or the immediate exercise of the option would be profitable:

$$Pm^c \geq P_s - P_x \tag{20.2}$$

But by developing the argument in point 5 above, we can develop another pricing rule. Compare two strategies: (i) buying the underlying asset in the cash market now and holding it for three months; (ii) buying a three-month European call option and exercising it at the strike price at expiry. The gain in following strategy (ii) is the difference between the present cash price and the premium. At the point of expiry, however, strategy (ii) will deliver only the difference between the cash price at that time and the strike price:

$$(P_s^2 - P_x) \geq 0$$

where  $P_s^2$  is the cash price at expiry. Thus, the maximum loss associated with strategy (ii) will be the value of  $P_x$  in three months' time. To compare this with the present gain, we need to discount it back to the present and, since we might have invested the amount saved in the present from strategy (ii) at the risk-free rate of interest, we should use that rate of interest to discount back the strike price. Thus we have:

$$P_s - Pm^c \geq P_x e^{-i_f t_m} \tag{20.3}$$

where  $P_x e^{-i_f t_m}$  is the discounted value of the cash price and hence:

$$Pm^c \geq P_s - P_x e^{-i_f t_m} \tag{20.4}$$

That is, the premium of the call option must at least equal the present cash price minus the discounted strike price. This rule must also hold for an American option since an American option must be more valuable than a European option because it adds the time value of the option between the present and the expiry date to the intrinsic value of the option at expiry.

Equation 20.4 formalizes the argument above that an increase in the risk-free rate of interest ( $i_f$ ) increases the premium of a call option since it reduces the present value of the strike price at the point of expiry ( $P_x e^{-i_f t_m}$ ). From Equation 20.4, we can also see that the premium must be greater than the difference between the cash price and the strike price ( $P_s - P_x$ ) since the strike price is discounted back from the expiry date. The expression on the right-hand side of Equation 20.4 ( $P_s - P_x e^{-i_f t_m}$ ) can be negative although, as we saw in Equation 20.1, an option premium will never fall below zero. Thus, it is usual to combine Equations 20.1 and 20.4 into:

$$Pm^c \geq \max(0, P_s - P_x e^{-i_f t_m}) \tag{20.5}$$

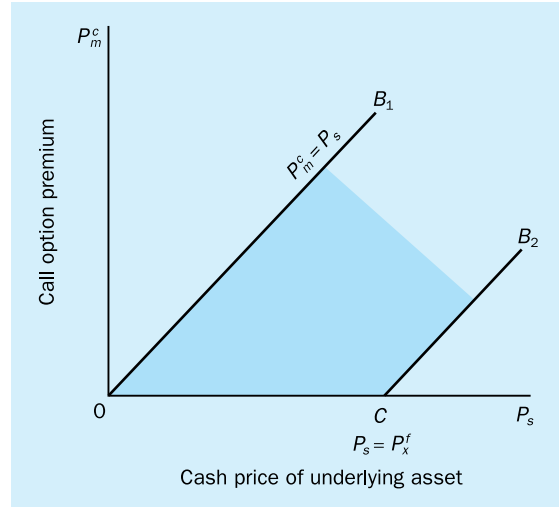


Figure 20.1 Option pricing limits

We can now use Equations 20.1, 20.2 and 20.4 to establish boundary conditions for the pricing of options as shown in Figure 20.1.

Writing,  $P_x e^{-i_f t_m}$  as  $P_x^f$  for ease, we can interpret the diagram in the following way. Given the cash price of the underlying asset, the greatest value an option can assume will be where the strike price is zero. With a zero strike price ( $P_x$ ), Equation 20.4 tells us that the call option premium will just equal the cash price. That is, the maximum premium for an option is shown along the ray from the origin  $OB_1$  which is at 45 degrees to the horizontal axis. The minimum price of any option will be zero and this will occur where the cash price is less than or equal to the discounted strike price  $P_x^f$ . For any given value of  $P_x^f$ , as  $P_s$  rises above  $P_x^f$ , the option premium will rise in line with the cash price (along the line  $CB_2$ ). However, since  $P_x^f$  will change with changes in the strike price, the risk-free rate of interest, and the time to the expiry date of the option, it is clear that the premium may fall anywhere in the shaded area between  $OB_1$  and  $CB_2$ . Exercise 20.3 gives practice in the calculation of the minimum price of a call option.

A number of options pricing models have been developed to allow the calculation of options premiums within the band illustrated in Figure 20.1. Expectations regarding the likely future cash price of the underlying asset are crucial in such calculations since it is the future cash price that will determine the profitability or otherwise of the option. We have seen,

**Exercise 20.3 Boundaries on options**

Assume that for April \$/£ call options on the Chicago Mercantile Exchange in Table 20.2 contracts had one month to run to expiry and that the risk-free interest rate in the USA was the rate available for one-month money in the US money market (1.1 per cent). Thus, to discover the maximum call option premium for a strike price of 1.21 we discount back the strike price at a rate of 0.011 for one month and subtract the figure we obtain from the spot price on the day (\$1.2225).

*Read example A below and then supply the missing figures for examples B and C.*

**A. Strike price \$1.21**

- 1 Discounting back \$1.2100 at 0.011 for one month gives \$1.209.
- 2 Subtracting \$1.209 from the spot price of \$1.2225 gives \$0.0135.

The premiums are, however, expressed in cents per €. Therefore, the minimum premium should be 1.35 US cents per €. We also know from Equation 20.2 in the text that the premium must be at least equal to the intrinsic value of the option. This was  $\$1.2225 - \$1.21 = \$0.0125 = 1.25$  cents. A price of 1.35 cents thus lies above the intrinsic value and we return to the position that the minimum price should have been 1.35 cents per euro.

We see from Table 20.2 that the actual premium for April contracts with a strike price of \$1.21 was, in fact, 2.08 cents.

**B. Strike price \$1.23**

- 1 Discounting back \$1.23 at 0.011 for one month gives (B1).
- 2 Subtracting (B2) from the spot price of (B3) gives (B4).
- 3 The premium for a call option at \$1.23 should have been above (B5).
- 4 The actual premium on this option in Table 20.2 is (B6).

**C. Strike price \$1.24**

- 1 Discounting back \$1.24 at 0.011 for one month gives (C1).
- 2 Subtracting (C2) from the spot price of (C3) gives (C4).
- 3 The premium for a call option at \$1.24 should have been above (C5).
- 4 The actual premium on this option in Table 20.2 is (C6).

**D. Comment on the difference between your answers for B5 and B6 and C5 and C6**

in particular, that the expected volatility of the cash price above the level at which it is greater than the discounted strike price ( $P_s > P_x^f$ ) is very important here since that indicates the chances of the cash price reaching high levels and thus producing high profits. Assets with stable prices are less likely to produce large profits and hence will have lower time value.

The usual assumption for the pricing of options is that future volatility can be estimated from the past volatility of the cash price in question. Thus, the premium for a call option to buy euro (with dollars) will be influenced by the past distribution of the \$/€ rate about its mean. The greater the variance of the rate in the past, the higher will be the option premium. This

is the basis of the best known of the various theoretical models for pricing models, the Black–Scholes options pricing model which is based upon shares on which no dividends are paid. Detailed treatment of options pricing models is beyond the scope of this book but we can get a feel of the nature of the Black–Scholes model by modifying Equation 20.4 as follows:

$$Pm^c = P_s N(d_1) - P_x e^{-r t} N(d_2) \quad (20.6)$$

Here the cash price ( $P_s$ ) and the discounted strike price ( $P_x e^{-r t}$ ) are multiplied by  $N(d_1)$  and  $N(d_2)$  respectively. This provides a measure of possible future profit levels given the past variance ( $\sigma$ ) of the cash price of the underlying asset. Formally,  $N(d_1)$  and  $N(d_2)$  are



cumulative weighted normal probability values of  $d_1$  and  $d_2$ , which are calculated in their turn as follows:

$$d_1 = \frac{\ln(P_s/P_x) + [i_{rf} + (1/2)\sigma^2]n_m}{\sigma\sqrt{n_m}} \quad (20.7)$$

and

$$d_2 = d_1 - \sigma\sqrt{n_m} \quad (20.8)$$

where  $n_m$  is the length of time the option has to run to expiry and  $i_{rf}$  is the risk-free rate of interest. That is, the probabilities are derived from a log normal distribution of possible cash prices. The weighting takes into account the fact that low values of the cash price are of no significance since the option premium cannot fall below zero. In general, the greater is the expected volatility of the cash price and the longer the time to expiry, the more dispersed the distribution will be. The more dispersed the distribution, the higher will be the probability of extreme values occurring. Thus, the more dispersed the distribution, the greater will be the weighted sum of potential profits to the buyer and the higher the premium will be.

Similar principles may be used to calculate theoretical premiums for put options and for exotic options. Of course, the market is likely to use calculations from models such as the Black–Scholes options pricing model as a guide. If buyers and writers held rational expectations, they would take into account all the information that might affect future volatility, not just calculations based on the dispersion of past cash prices. In a market where expectations differ from one investor to another, speculators will be attempting to make profits by guessing better what will happen than the average investor. We have seen in Box 20.2 that investors use strategies which enable them to profit if they guess correctly that the market will be more or less volatile than the average investor believes. In Box 20.7, where we look at the collapse of the British bank, Barings, we see that the trader, Nick Leeson, was betting on Japanese share prices remaining stable, which had been the recent experience. In fact, they became very volatile.

## 20.5 Exotic options

There are many variations on the simple call and put options dealt with above. They are known as *exotic options*. We explain some of them here.

### More from the web

Do you need some more examples? Many glossaries and explanations of financial products are available on the web. For exotic options and other derivatives try, for example, [www.finpipe.com/exoptions.htm](http://www.finpipe.com/exoptions.htm). This site also provides a good set of internet links. A useful introduction to derivatives is available on the Bank of England website, downloadable in PDF form: [www.bankofengland.co.uk/ccbs](http://www.bankofengland.co.uk/ccbs). Choose the Handbooks in Central Banking link and then you will find a list of handbooks available. Financial Derivatives is No. 17.

**Barrier options** are over-the-counter options designed to meet the particular needs of customers. They are also known as *knock-in* or *knock-out* options which means that they come into being (knock-in) or lapse (knock-out) when specified prices of the underlying asset are reached. There are four types of barrier options: calls and puts, each with a knock-out or knock-in feature.

A knock-in barrier option pays nothing at expiry unless it is first brought to life as a result of the price of the underlying asset reaching a specified level (the barrier). A knock-out option begins life as a standard option but is killed off if the cash price touches the barrier. Because they might never come into existence or might be killed off, they are much cheaper than conventional options. They are often used in the foreign exchange market by chartists who feel strongly that exchange rates will not fall below support levels or rise above resistance levels. Box 20.5 discusses the use of barrier options.

**Credit risk derivatives** or credit derivatives were devised by banks to help manage their own credit risks but were then marketed to clients. The most popular has been the credit default option which protects the buyer against the default of a specific company or country. For example, an option might be taken out by a company which expects to be paid €20m in three years' time when it completes a project in a foreign country. But since the country in question has defaulted on similar payments in the past, the company wants insurance against default risk. Hence it may take out an option with a bank which requires it to pay the premium in annual or semi-annual portions to the bank. In the event of a default, or a breach of other criteria agreed at the start of the option, the company will receive a payment.

### Box 20.5 The use of a barrier option

A German company which imports oil, paying in US dollars, expects a bill for \$1 million in three months' time. The current exchange rate is  $\$1.22 = \text{€}1$ . If the company is happy with that rate, it might buy a three-month euro call at that exercise price. This would protect the firm against the euro weakening and, if the euro strengthened, in the following three months the option could be allowed to lapse and the \$1 million bought spot at a more favourable rate.

A *knock-out* euro call would give the same protection against the weakening of the euro (downside protection) but only until the exchange rate falls to a level below which the firm thinks it is unlikely to go. For example, a knock-out option with the same strike price and a barrier set at  $\$1.18 = \text{€}1$  might cost much less than the standard option because the more extreme possibilities of loss to the writer would be cut off by the option being knocked out. If, at any time within the three months, the spot rate touched  $\$1.18$ , and the option ceased to exist, the firm could buy the necessary euro in the spot market at that rate and put it on deposit until needed.

Barrier options are also used in investment products to enhance yield or to allow investors to express a view on two or more assets with a single instrument. For example, it would be possible to have a call option on a basket of French equities which knocked out if the euro appreciated by more than a given percentage against the dollar. This would be an example of an *outside barrier* – the barrier asset (the exchange rate) is different from the asset on which the basic option is written.

Another popular application during periods of low interest rates has been to use two knock-out options to create structured notes which pay high returns provided an underlying asset remains within a certain range. A typical example is a one-year dollar-denominated bond which yields 200 basis points more than conventional one-year paper provided the dollar/euro exchange rate remains within the ranges  $\$1.18\text{--}1.22 = \text{€}1$ . The narrower the range and hence the more likely that the option would be knocked out, the greater the yield would be.

The bank arranging the option will use outstanding bonds issued by the country concerned as a benchmark for setting the premium but since the bank will be hedging its own position by issuing bonds of a similar amount to investors, the company will have to pay above the yield on the outstanding bonds to attract buyers for the bonds backing the transaction. In the event of a default, there are various ways in which the size of the bank's payment may be calculated and the formula chosen by the company will influence the premium of the option. Credit risk derivatives are also sometimes bought by a fund manager holding, say, double-A rated bonds to compensate him if the securities were downgraded to single-A. For further details on credit derivatives see Section 24.3.3.

Other exotic options include:

- *Lookback options*: options that give the right to buy (lookback call) or sell (lookback put) at the lowest price reached by the underlying asset during the life of the option.
- *Asian options*: options whose intrinsic value is calculated by comparing the strike price with the average spot price over the period of the option.
- *Options on options*: an option that gives the right to buy an option.

- *Flex options*: options offered by the Chicago Board Options Exchange (CBOE) which allow an institutional OTC customer to choose any strike price and expiry date up to five years. Initially they applied to the CBOE's Standard and Poor's 100 and 500 Stock Index baskets and had an underlying value of \$10m, much larger than the standard index options contracts.
- *Warrants*: options to purchase or sell an underlying asset at a given price and time or series of prices and times. A warrant differs from a call or put option by ordinarily being issued for longer than a year. With covered warrants the shares that holders receive, if they exercise their warrants, already exist. Thus, the issuer of covered warrants is usually a bank that has bought up underlying shares. On the other hand, when companies issue warrants, usually in conjunction with bonds, it is generally a means of raising funds by creating new shares if the warrants are exercised.

## 20.6 Swaps

Swaps are exchanges of cashflows. They are attempts by firms to manage their asset/liability structure or to

reduce their cost of borrowing. Cashflows generated by many different types of financial instruments may be swapped. Simple swaps such as interest rate and currency swaps are sometimes known as plain vanilla swaps. There are many variations on these.

An **interest rate swap** is an exchange of a cashflow representing a fixed rate of interest on a notional capital sum with that representing a floating rate on the same sum in the same currency. There is no exchange of the principal amount. They are potentially useful because the fixed and floating capital markets are distinct markets and firms wishing to borrow may not have equal access to both. For example, a firm may be quite large in a regional market and be able to borrow from regional banks at fine floating interest rates (that is, the rate at which banks themselves obtain their money – the basis rate or interbank rate – plus a small fixed rate spread). Nonetheless, it may be insufficiently well known to be able to launch a fixed interest rate bond without offering a high coupon because of the high risk premium that will be demanded in the bond market for holding bonds issued by a little known firm (because the firm is only regional it may be given a low credit rating by the international agencies).

Taking the floating rate loan, however, exposes the firm to the risk that interest rates may rise. The firm may be able to obtain better fixed interest rate terms in the national capital market on relatively short-term loans but will still face the interest rate risk if it wishes a long-term loan because the interest rate may change when it seeks to rollover the loan. The firm may be able to hedge the risk in a variety of ways. It could, for example, sell a long-term interest rate futures contract. Then, if the interest rate rises, the firm loses on its loan but this loss is offset by the profit made on the futures contract. Again, the firm could hedge by buying a put (or writing a call) option on long-term interest rates or interest rate futures. Yet another possibility is for it to swap the interest rate payments it must make to its bank with a fixed interest rate flow of another firm that has been able to obtain a suitably priced fixed interest rate loan but would prefer a floating rate loan.

The default risk in a swap of future cash streams between firms is overcome in the swaps market by arranging the swap through a bank (the swap bank or hedge bank) which acts as a guarantor to both parties and charges a fee that takes into account the risk that one of the firms will default on their payments to the bank. This type of business has advantages to the bank because it earns a fee for its services without advanc-

ing any of its capital or using up any of its credit lines – it is off-balance-sheet business. Box 20.6 provides an example of how an interest rate swap might work to benefit all parties.

This is an example where payments are swapped but receipts may also be swapped. Yet again, since the capital sums are only notional, it is possible to speculate on the possibility of an interest rate rise or fall through interest rate swaps. For example, a speculator might feel that interest rates are likely to fall and so offer a floating rate stream (which will fall as market interest rates decline) in exchange for a fixed rate stream which will not. If the speculator is right about the direction of interest rate change s/he will profit from the swap. The price of a swap (the charge made by the swap bank for its services) depends on the bank's estimate of the extent of default risk, the ease with which it can obtain a counterparty and the term structure of interest rates in the bond market.

A **currency swap** has three stages:

- an initial exchange of principal: the two counterparties exchange principal amounts at an agreed exchange rate. This can be a notional exchange since its purpose is to establish the principal amounts as a reference point for the calculation of interest payments and the re-exchange of the principal amounts;
- exchange of interest payments on agreed dates based on outstanding principal amounts and agreed fixed interest rates;
- re-exchange of the principal amounts at a predetermined exchange rate so the parties end up with their original currencies.

Again this may be done to hedge risk, to speculate on changes in exchange rates or to attempt to lower the cost of borrowing by borrowing in the currency in which the most favourable interest rates are available and then swapping into the currency that the firm needs to carry out its business. Whether this will be cheaper will depend among other things on the bid-offer spread.

There are many variations on simple currency swaps. In a **cross-currency basis swap** two floating rate cash streams are swapped. This may be possible because the banks that have made the two loans are using a different basis rate for the calculation of their floating interest rates. The most commonly used basis rate in the London market is Libor (the London Inter-Bank Offered Rate). The US dollar prime rate is also widely used. Thus, a basis rate swap may involve, for example,

### Box 20.6 An interest rate swap

A major British defence industry supplier, Death Mines plc, wishes to borrow £1m for 12 years at a fixed interest rate to finance a new investment project. It could do so by issuing a straight Eurobond but, as the international market has some doubts about the future of medium-sized arms suppliers, it would have to pay a coupon of 9 per cent which it regards as too high. The firm's own bank is willing to lend Death Mines the required amount via a one-year floating rate note at a rate of 1.5 per cent over the London Inter-Bank Offered Rate (Libor), currently at 5 per cent, and rollover the loan annually.

The floating rate loan is much cheaper at the moment, but Libor could easily rise over the period of the loan to such a level that Death Mines will finish up losing on the project. Thus, it enters into a contract with a swap bank, Border International, to pay to it 6 per cent on the principal, receiving in exchange Libor.

*The position of Death Mines now is:*

Pays to its own bank	Libor + 1.5%
Pays to Border	6%
Receives from Border	Libor
Net position – fixed rate loan at	7.5%

But what of Border International? It has taken on a risk that Libor will increase. To cover this, it must either find a counterparty that wishes to take the reverse action to Death Mines or hedge the risk through, perhaps, options or futures (this is known as warehousing). Let us assume that Border International finds a counterparty – a large US multinational, Global Heat. Global Heat is a prime borrower and so can borrow on the Eurobond market on the finest terms, but prefers a floating rate loan as it is willing to gamble on interest rates falling in the future. Thus, it issues a straight £1m Eurobond with a coupon of 5.375 per cent. Then it enters into a contract with Border International to pay Border Libor in exchange for a fixed return of 5.75 per cent.

*The position of Global Heat now is:*

Pays on its straight Eurobond	5.375%
Receives from Border	5.75%
Pays to Border	Libor
Net position: floating rate loan at	Libor – 0.375%

*Border International's Position now is:*

Receives from Death Mines	6%
Pays to Death Mines	Libor
Receives from Global Heat	Libor
Pays to Global Heat	5.75%
Net position – profit of	0.25% (25 basis points)

an exchange of a sterling cash stream representing a floating interest rate based upon Libor with a dollar cash stream representing a floating rate based upon the US\$ prime rate.

A **cross-currency coupon swap** is a currency swap involving a fixed interest stream and a floating interest stream. In other words, it is a combination of an interest rate swap and a fixed rate currency swap – both the interest rate structure and the currency are exchanged.

Other types of swap include **equity swaps** which are agreements to exchange the rate of return on an equity or an equity index for a floating or fixed rate of interest. Equity swaps can be used as an alternative to futures and options for hedging but are most attractive to fund managers trying to outperform an index. The fund

manager receives a stream of payments replicating the return of a direct investment in an equity index and makes in return a stream of payments usually based on Libor. An equity swap may increase a fund manager's ability to increase returns but because swaps, unlike futures, can run for up to 10 years, the default risk is greater, although exposure to it is limited by payments normally being made every three months and because there is no exchange of principal.

In a **commodity swap** the counterparties exchange cash flows, at least one of which is based on a commodity price or commodity price index. A high proportion of the market is made up of oil-related transactions. A **diff swap** (or *quanto swap*) is the exchange of the cash flows on an asset or liability in one currency for

those in another. A firm making a diff swap separates foreign exchange and interest rate exposure, by paying interest rates based on one currency while taking the foreign exchange risk of another. For example, a company with US dollar liabilities, paying say 7 per cent interest, would prefer to be paying euro interest rates of 4.5 per cent but may not want to be exposed to the risk of changes in the value of the euro. Under a diff swap, the company agrees to receive dollar Libor and to pay a margin over euro Libor in dollars. The structure takes advantage of different-shaped yield curves to create immediate cost savings for the borrower and allows an investor to receive higher interest rates without changing currency exposure. Such an agreement typically runs from three to five years and so the risk for either borrower or investor is that the shape of one or both yield curves will change more quickly than expected, turning expected benefits into losses. Diff swaps became common when US and European interest rates diverged sharply. They involve *correlation risk* – an assumption that there will be a correlation between an interest rate movement and that of the currency. With a *Libor-in-arrears swap*, the borrower essentially takes a bet that implied forward rates are wrong by having Libor set, say, six months in arrears.

It is also possible to combine a zero coupon bond with an interest rate swap (known as a zero coupon swap). Then there are *swaptions* – options that give the right to enter into a swap within a specified period. Because swaps are off-balance-sheet business but carry risks for the swap bank there was a concern in the past that banks might take on more risk through swaps than was justified by the size of their capital backing. As a consequence, the rules adopted by a number of countries (known as the Basel rules), which try to ensure that the capital backing of banks is adequate for the type of business in which they are engaged, make allowances for off-balance-sheet business. Because currency swaps involve both default risk and exchange rate risk, they require higher capital backing under the Basel rules and this has slowed down their expansion relative to interest rate swaps.

There are yet other derivatives that do not fit neatly under the futures, options and swaps headings. One such is *equity protected notes* – a zero-coupon, index-linked note that allows investors to protect themselves against potential losses without giving up the possibility of gains. *Dynamic hedging* involves the buying and selling of forward contracts in the market

in order to replicate options. It became popular in foreign exchange markets after the problems in the European Monetary System in 1992 which caused options prices to rise sharply. *Safes* (synthetic agreements for forward foreign exchange) are forward contracts that do not require an exchange of principal. This means that banks need to devote less capital to them and are less exposed to default risk. There are two types of Safe: the Exchange Rate Agreement (ERA) which protects the purchaser against a change in the forward foreign exchange spread; and the Forward Exchange Agreement (FXA) which gives protection against a change in the spot rate as well as the forward spread. *Insurance risk contracts* are futures and options on catastrophe insurance, health, and homeowner's and reinsurance risk.

## 20.7 Comparing different types of derivatives

### 20.7.1 Exchange-traded versus OTC options

Exchange-traded options have five principal advantages over over-the-counter options:

- 1 the existence of the clearing house guarantees all trades and virtually eliminates the default risk present in OTC trades;
- 2 price discovery is easier from exchange-based trading than in OTC markets because exchange-traded options contracts are reported immediately and prices are widely distributed;
- 3 markets for exchange-based options are more liquid than bilateral OTC trades since there are many traders;
- 4 exchange-traded options are highly tradable because they are standardized whereas OTC options, being non-standard and redeemable only at the bank where they were bought, have a low re-sale value;
- 5 exchange-based options are lower in price than options with OTC derivatives since there will almost always be some irreducible residual risk that a bank is forced to take onto its own book, despite the fact that it will attempt to minimize its risks by arranging offsetting contracts with other customers/banks and/or by taking a position in exchange-traded options.

Against these, we must set the fact that OTC options are designed to meet the specific requirements of each customer in terms of size, strike price and expiry.

### 20.7.2 OTC outright contracts versus futures

There may be important cashflow differences between OTC outright and futures contracts because, whereas net profits on a futures hedge are accrued on a daily basis, the net profits on an OTC forward hedge are only realized on the actual date of currency delivery (assuming the forward contract is not closed out prematurely). A different type of problem connected with the use of futures contracts to hedge an exposed currency position arises in cases where the lifetime of the futures contract continues beyond the intended date of currency delivery. This problem stems from the fact that the difference between the futures and spot rates may not tend uniformly towards zero as the delivery date for the futures contract approaches, which is the assumption that underlies calculations of the forward rate. Eventual convergence is certain, but in the meantime as the basis moves to compensate for changes in interest rate differentials between countries, so the futures hedge will tend to be in either profit or loss. Clearly, the further the anticipated date of actual currency conversion is from the futures delivery date, the less the natural tendency towards zero of the basis will dominate other factors and hence the less efficient the hedge.

### 20.7.3 Outright contracts versus options

Outright contracts lock in an investor to a given exchange rate. Thus, the contract provides a hedge if the exchange rate moves in the direction that would have produced a loss, but there is an opportunity loss if the currency moves in the opposite direction. Currency options, on the other hand, do not lock in an investor to a particular exchange rate since the option does not have to be exercised.

## 20.8 The use and abuse of derivatives

We have seen that financial derivatives allow firms to hedge against erratic price and interest rate movements while also attracting speculators because of their high gearing. These two aspects of the market have led to conflicting attitudes regarding their overall contribution to financial markets. Supporters of derivatives markets argue that they perform a number of important roles. They are said to:

- facilitate the hedging of risk through sophisticated risk management, and by so doing improve the productivity of investments;
- respond more quickly to new information than the cash markets and allow people who do not participate in derivatives trading to forecast accurately what will happen to future cash market prices and use this information to make better consumption, pricing and investment decisions – this is known as the ‘price discovery’ role of derivatives;
- assist in the standardization of commodity or financial instrument contracts in the cash markets because derivatives contracts are highly standardized themselves;
- contribute to the integration of global capital markets, hence improving the global allocation of savings and fostering higher investment levels;
- help to combat the adverse effects of volatile commodity prices on the economies of developing countries because forward prices tend to be less volatile than spot prices, giving commodity producers an opportunity to reduce the volatility of the price of their output through hedging;<sup>1</sup>
- facilitate speculation which provides liquid markets enabling hedgers to protect themselves from risk in the most efficient way possible.

Doubts have been expressed about the price discovery role since it is dependent on the efficient markets hypothesis. However, the main doubts expressed about the benefits of derivatives have centred on the role of speculation and the difficulties that the increasing complexity of derivatives products have caused for regulators. Support for the attack on derivatives

<sup>1</sup> This role was emphasized in a 1994 World Bank report which referred to a study of the oil futures market in the late 1980s where it was suggested that a producer routinely hedging 15 months in advance could cut price volatility by a half.

trading has come from problems in markets as a whole and from examples of spectacular losses by individual companies and banks.

For example, derivatives trading was widely held to be partly to blame for the 1987 stock market crash. The argument was that stock market traders were pessimistic and expected a fall in the price of stocks when the exchanges opened after a weekend. Large orders to sell arrived at brokerage houses prior to opening and, as the market started falling, many traders automatically sold futures in the shares of the major corporations. This destabilized stock markets and contributed to the panic selling of stocks and shares. This view of the crash led to a general concern that high turnover in derivatives, particularly that involving large-scale arbitrage techniques, may contribute to the volatility of the cash market. This is strenuously denied by the derivatives markets themselves, but worries have been expressed at a high level. Towards the end of April 1994 finance ministers from the Group of 10 leading industrial countries agreed on the need to strengthen cooperation in gathering statistics and assessing the implications for the world financial system of the innovative segments of financial markets. There was also a call for improved disclosure requirements and sufficient capital adequacy standards among financial institutions to underpin their risky activities.

Certainly there is some evidence that Wall Street equity prices have been affected by heavy activity in stock index contracts, especially around expiry dates, and there is a possible theoretical argument to support the view that derivatives trading makes the cash markets more volatile and nervy. This is that, in the past, people who thought prices in a market were becoming too high would speculate and express their bearish feelings by leaving the market. This would exert downward pressure on prices and help to stabilize them. Now, however, such firms stay in the market but protect themselves against risk using derivatives markets. No sale is made and bearish opinion loses its restraining influence on prices. Thus, although spreading risks through derivatives reduces risks for the individual, it increases risk for the system as a whole. This in turn provides big profit opportunities for the uninsured speculators but increases risks of bankruptcies.

Individual company losses through derivatives have in recent years become almost routine. The most spectacular was the collapse of the British merchant bank Barings in 1995. It is explained in Box 20.7.

#### More from the web

For contemporary newspaper and other reports of major financial scandals, see the website of Roy Davies, a librarian at Exeter University. Go to his home page: [www.ex.ac.uk/~RDavies/](http://www.ex.ac.uk/~RDavies/) and then add `arian/scandals`. There is a good deal of entertaining material on this site.

Another interesting case arose from the attempt made in the late 1980s by Hammersmith and Fulham local authority in London to profit from speculation in interest rate swaps, but they ran up huge losses instead. They entered the sterling interest rate swaps market on 1 December 1983. Council officers had visited LIFFE where the idea of using swaps to reduce the sensitivity of the council's borrowings to interest rate fluctuations was explained to them. An independent inquiry in 1991, however, showed that such was the level of the user's understanding that the leader of the council and the finance department were not clear whether they were interested in futures or options transactions. The council's activities in the money markets intensified in May 1987 when it began to become involved in swap options and other complex transactions, eventually totalling 550 transactions.

At the time, interest rates were falling and the local authorities gambled on their continued fall. Thus, in 1988 when the base rate of interest in the UK was 7.5 per cent, local authorities swapped fixed interest rate for floating interest rate loans of the same value with hedging banks. The only payments made were for the net liabilities on whichever was the higher – the fixed or the floating rate. Thus if interest rates had continued to fall the local authorities would have profited. Their aim was to pick correctly the trough in interest rates and at that stage to reverse the swap, moving back to a fixed interest rate, probably at a lower rate than their original interest payments.

However, the local authorities were taken unawares by the sharp jump in interest rates which saw the base rate of interest rise to 15 per cent in 1989. They were then, under the terms of the contract, required to pay large amounts to the banks – the difference between the now very high floating rates and the fixed rate on their original loans. Despite the volume of contracts and the size of the risk, there was never any monitoring system established to track the performance and possible dangers of their derivative business. But the

### Box 20.7 The case of Barings

The British merchant bank, Barings Brothers, was bankrupted in 1995, after losses of more than £860 million accrued on the Singapore and Osaka derivatives exchanges. The bank was the victim of its own star trader, Nick Leeson, and the absence of management controls to monitor his activities. Leeson was responsible for both trading and back office records of his deals at Simex (the Singapore International Monetary Exchange). He had started by running a hedged position in futures on the Japanese Nikkei stock exchange index and to make money by arbitrage – taking advantage of different prices on the Singapore and Osaka exchanges. However, he stopped hedging the purchases made in Singapore and between 1992 and 1995 built up positions in futures and options contracts on the Nikkei 225 index. Initially this proved highly profitable for Barings and the management asked few questions about his activities.

Leeson bought futures positions on the Nikkei index such that he was betting against the volatility of the market. That is, he would make losses if the index either rose or fell by large amounts but would profit from the index remaining stable. Everything seemed secure enough until early 1995 since during 1994 the Nikkei index had stayed within a narrow range. However, in early 1995, the combination of a large earthquake in Kobe in Japan and a turn in investor sentiment against Japanese markets drove the Nikkei index sharply down. This meant that Leeson needed to make daily margin payments with the clearing house. He assumed that the Nikkei index would soon recover and financed the required margin payments by writing put options on the contract. The hope was that when the Nikkei index again rose, these put options would be abandoned, leaving Leeson with the premiums as profit. He began writing the put options in early February. Further contracts were agreed in mid-February to provide cash to cover losses as the Nikkei index continued to fall. At least 20,000 contracts were bought expiring in mid-March. Each point of the Nikkei 225 futures contract carries a value of ¥1,000, and so with the Nikkei 225 trading at levels between 18,000 and 20,000 in the first few weeks of the year, each future would have had a value of some ¥18–20 million. With 20,000 contracts, the fall in the index from 19,600 to 17,600 produced losses of ¥40 billion on the put options in addition to the losses on the initial futures and options contracts. The writing of the put options transformed an already highly geared trading strategy into a perilous double-or-quits game.

Leeson concealed the growing losses from the Bank for some time in the hope that the market would suddenly turn around and he would be saved at the last moment. This did not happen and when the desperate position finally became known he had built up total losses that far exceeded the capital of the bank. The bank collapsed. Most of Barings' employees were saved by Internationale Nederlanden Group which bought Barings and took on its losses. ING paid £1 for the bank. Leeson was later jailed in Singapore for the falsification of records in the attempt to conceal his activities.

ratepayers of the most indebted local authorities were rescued by the courts, which ruled that it had been illegal for the local authorities to use their funds in this way and therefore that the contracts were unenforceable. The banks thus found themselves exposed to **legal risk**.

Yet another famous case was that of Metallgesellschaft (MG), the fourteenth largest industrial concern in Germany. The strategy of its US affiliate, MG Refinery and Marketing Inc., was to sell petrol, diesel and heating oil products to customers on fixed price contracts up to 10 years ahead. It then protected itself against price movements by hedging the full amount with futures and OTC swap contracts. Over the previous 10 years, spot prices had mostly exceeded near future prices (backwardation). This meant that hedging in short-dated futures would produce profits as each expiring contract yielded more than it cost. However,

in 1993, a contango occurred, upsetting MG's calculations and shocking its banks. Every \$1 fall in the spot oil price meant an extra \$160 million of margin payments. Also complicating the question was the fact that MG was losing money every time it rolled over its oil futures contracts. On each rollover date, as it sold expiring futures contracts and bought new ones to carry the hedge forward, MG had to pay more for the new contracts than it received for the old ones because of the contango. This rollover cost amounted to \$20–30 million in each of October and November and would have been \$50 million in December. MG had to pay out over \$900 million in the form of additional margin on its futures positions, and extra collateral to counterparties on over-the-counter swaps. This resulted in a severe liquidity crisis, leading to an emergency line of credit from banks and a forced unwinding of most of the company's derivative positions. Longer-term



hedging contracts would have been available – but at a higher price. It was the funding cost of the short-term hedging strategy that led to the heavy losses. Had winter come earlier (causing the spot oil price to rise), the crisis would have been averted, but there was no guarantee that it would not have arisen later. In January 1994, 150 German and international banks, headed by Deutsche and Dresdner Bank, mounted a DM3.4 billion rescue operation to save Metallgesellschaft from bankruptcy.

The large American firm, Procter and Gamble, was in 1994 required to make \$102 million after-tax charges on its profits arising from swap transactions losses. It later sued Bankers Trust, claiming that Bankers Trust did not ‘accurately and fully’ disclose information about the derivatives contract. Procter and Gamble had been using derivatives instruments to cut the cost of its borrowing and manage its exposure to interest rate and foreign exchange for years. However, the company took out two highly geared swaps contracts, designed by Bankers Trust to allow Procter and Gamble to swap fixed interest rate loans for floating interest rate loans, on the assumption that US and German interest rates would stay low. When interest rates rose sharply, Procter and Gamble lost money on the contracts, which they later said were inconsistent with the company’s internal policy on the use of derivatives. Bankers Trust were also sued at the same time on similar grounds by another American company, Gibson Greetings.<sup>2</sup>

Tokyo Securities lost ¥32 billion, one-third of the firm’s net assets, in 1994. Kashima Oil, a Japanese company, lost \$1.5 billion in foreign exchange derivative trading. The head of bond trading at the US securities firm, Kidder Peabody, was fired in 1994 for allegedly creating \$350 million of fictitious profits. The firm was broken up largely as a result. In 1991, another US securities firm, Salomon Brothers, had to pay several hundred million dollars in fines and compensation after its head of bond trading was found to have faked customer bids in Treasury auctions. The new management had to write off several hundred million dollars more early in 1995 for past bookkeeping errors. The Japanese car manufacturer, Mazda, lost ¥65 billion on its foreign exchange transactions in 1993/94.

On the other hand, the Italian clothing firm, Benetton, achieved a one-off gain of L50 billion from some well-timed currency hedges when the lira strengthened against the DM by almost 10 per cent in three months in 1993.

The Australian bank, Westpac, suffered from tax risk in 1992 when it was forced to pay an unexpected tax liability and penalties of nearly \$80 million in the USA because of conflicting tax treatment of swaps and forward contracts in the USA and Australia. In 1991, Allied-Lyons lost £150 million in foreign exchange dealings, through writing currency options. This can lead to unlimited losses. This case is treated in Exercise 20.4.

A trader at Daiwa, one of Japan’s largest and once one of its most respected financial institutions, incurred losses of millions of dollars a week on the trading of government bonds. The total losses amounted to \$1.1 billion. He hid those losses over 11 years by selling securities which the bank held but which belonged to its customers. To avoid suspicion, he continued to pay interest on those securities by forging bank statements. He confessed in July 1995 but the management then took steps designed to conceal the losses from the US authorities. The losses were not revealed to the world at large until September. Thus, in November, Daiwa was ordered by the US authorities to close its US operations and the company was accused of conspiring to defraud the United States by having lied to, misled and deceived US authorities. Specifically, Daiwa was accused of using its international treasury division in Tokyo to repurchase US Treasuries, making up for the missing ones sold by the trader and covering up what it was doing by preparing false documents including bank statements, internal records and a report issued to the Federal Reserve Board on 31 July, stating the bank’s balance sheet.

Between 1997 and 2002 John Rusnak, working in Baltimore for Allfirst Bank (at the time a subsidiary of Allied Irish Bank), made losses of \$691 million between 1997 and 2002 on forward purchases of yen, allegedly hedged by combinations of options and covered up through the development of fictitious options.

Many of these cases have had international implications. However, the most dangerous case from the

<sup>2</sup> For details of these cases see R Waters, ‘US bank settles derivatives law suit’ (*Financial Times*, 28 October 1994) and R Waters, ‘P & G sues bank over big loss on derivatives’ (*Financial Times*, 28 October 1994).

**Exercise 20.4****FT**

Read the following extract from the *Financial Times* and answer the questions that follow:

‘Allied-Lyons’ losses of approximately £150m, attributed to ‘abnormal foreign exchange exposures’, arose because the company took a strong view on the direction of the dollar, and got it wrong. It is standard practice for companies with a large portion of dollar-based income from both operations and exports, as Allied-Lyons has, to hedge against adverse currency movements.

‘But Allied-Lyons appears to have gone further, taking heavy positions on the expectation of dollar weakness. The company took positions in both derivative and cash markets, writing call options on the dollar, and selling the dollar short in the foreign exchange market, according to analysts . . .

‘Although it is quite common for large companies to write call options, it is a practice approached with caution. In buying a call option, the option holder can only lose the nominal cost of the option . . . Writing – that is, selling – a call option, on the other hand, leaves the writer with unlimited exposure . . .’

*Financial Times*, 20 March 1991

**Questions**

- What is meant by ‘hedging against adverse currency movements’? How might Allied-Lyons have hedged?
- What must they have done in order to go short in dollars?
- What is a call option in dollars?
- Under what circumstances will the writer of a call option in dollars lose?
- Explain why such losses may be unlimited.

point of view of world markets in general has been the near collapse in September 1998 of the US hedge fund, Long-Term Capital Management (LTCM). Hedge funds were originally US equity funds that hedged against market declines by holding short, as well as long, positions. However, they were using derivatives to take large bets on the direction of markets. Using a very complex system, LTCM risked 40 times its capital, a total exposure of \$200 million. Although LTCM’s board included Myron Scholes and Robert

Merton who had won the Nobel Prize for Economics for their work on the pricing of options, their system could not cope with the financial crisis that had developed in South-East Asia and Russia. As Tracey Corrigan wrote in the *Financial Times* of 26/27 September 1998, ‘all the complex formulae and computer models that the best brains had produced simply did not work when financial crisis spilt over from the emerging markets’.

LTCM was, in the event, rescued by the New York Federal Reserve, which recruited 14 financial groups to help. Prior to the rescue there were genuine fears that LTCM’s collapse would have led to the collapse of a large number of major world banks. Even with the rescue, UBS, Europe’s largest bank, had to accept a loss of £406 million.

**20.9 Summary**

Options are financial instruments that give the right to buy or sell an underlying financial instrument. Options are traded both on exchanges and over-the-counter and have many features in common with outright contracts – they are highly geared and are used by both hedgers and speculators. Options have advantages over outright derivatives contracts in certain circumstances. In particular, they may be used to provide protection against the market moving in one direction without removing the prospect of gain if the market moves in the opposite direction. The price or premium of an option can be divided into the option’s intrinsic value (the profit that would be made if the option were exercised immediately) and its time value (a measure of the possibility that the option’s value might increase before the expiry date). Arbitrage possibilities between the cash market and the options market establish boundaries within which the option premium must lie but the actual premium depends on the market’s estimate of the future volatility of the price of the underlying instrument.

Swaps are also widely used for hedging and speculation and for changing the structure of a company’s balance sheet or reducing the interest it must pay on a loan. The most common form of swaps are exchanges of interest rate streams or cashflows in different currencies. There are very many variations on both swaps and options. Derivatives of all kinds perform a number of roles in financial markets and are strongly

supported by many people. However, concern has been expressed about the effects of derivatives trading on the volatility of the underlying markets and the rapid growth of ever more complex derivatives trading has

made life difficult for regulators and company managers alike. One consequence of this has been the very large losses regularly experienced by companies through the use of the derivatives markets.

### Key concepts in this chapter

Options  
Strike/exercise price  
Option premium  
Call option  
Put option  
European option  
American option  
Synthetic call option  
Covered/naked call  
Intrinsic value  
Time value

Exotic options  
Barrier options  
Credit risk derivatives  
Interest rate swaps  
Currency swaps  
Cross-currency basis rate swaps  
Cross-currency coupon swaps  
Diff swaps  
Equity/Commodity  
Legal/tax risk

### Questions and problems

- 1 Explain each of the following:
  - (a) fixed rate currency swaps;
  - (b) an 'in-the-money' option.
- 2 Explain the statement made by the Chairman of the Chicago Board of Trade (CBoT) in the following extract:
 

'The Chicago Board of Trade will launch an oats futures options contract on May 1. Options on oats will provide a variety of hedging possibilities. The American Oats Association in Minneapolis said that producers were more likely to use options than futures. According to the CBoT chairman, by purchasing options a hedger can establish price ceilings and floors, and still benefit if cash prices change in his favor.'
- 3 Find out as much as you can about the activities and procedures of the international credit-rating agencies.
- 4 Answer the following questions concerning interest rate swaps:
  - (a) Why might a borrower wish to enter into such a swap?
  - (b) Why might such a swap be possible?
  - (c) What risk does the guaranteeing bank run?
- 5 Consider Table 20.1 and answer the following questions:
  - (a) Why do short sterling call options for March with strike prices at 95875 or above have premiums of 0?
  - (b) Why do the premiums on put options increase as the strike price increases?
  - (c) What do the premiums on Euribor options tell you about euro interest rates on 15 March 2004?
- 6 Find examples of companies having hedged through the use of derivatives products other than those mentioned in the text.
- 7 Find more information about some of the examples of company problems mentioned in the text.
- 8 Find as many examples as you can of exotic options and variations upon plain vanilla swaps.
- 9 What factors are likely to influence the price that a swap bank will charge for participating in a currency swap?
- 10 Why do you think so many types of derivatives have been developed over such a short period?

## Further reading

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Part 6

# Current issues



## Chapter 21

# The single European market

### *What you will learn in this chapter:*

- The objectives of the Single European Act of 1986
- The approach to estimating gains from the creation of the single market and criticisms of it
- The reasons for the slowness of progress towards a single financial market
- The advantages of home-country regulation of financial services
- The extent of progress towards a single market in banking, the securities market, and insurance



## 21.1 Introduction

Although the early history of the European Union was concerned largely with the removal of tariffs among member states and the establishment of a common commercial policy towards the rest of the world, the Treaty of Rome had required nothing short of a **single European market (SEM)** in all goods and services. To this end, the 1957 Treaty had specified the dismantling of all non-tariff barriers to the free movement of goods among members. The progressive abolition of all restrictions on the freedom to supply services, such as banking, insurance and communications services, across frontiers was also sought and this was to be accompanied by the free movement of labour and capital. All discrimination based on nationality was to disappear.

Progress in the removal of tariffs was quite rapid but, although the European Commission battled constantly towards the goal of a single market in all areas of production, the gains throughout the 1970s and early 1980s were small. The first stage of integration was complete by the mid-1980s but many of the other objectives of the Rome Treaty had not been achieved. Indeed, non-tariff barriers within the EU had almost certainly increased between 1975 and 1985, partly as a response to the removal of tariffs among members. Advances had been even slower in services, notably transport and financial services, than in other sectors of the economy. At the same time, there was increasing concern over slow rates of growth in much of the EU in comparison with apparently more dynamic economies elsewhere. Consequently, it was felt that a new drive was needed to deepen the integration among member countries. Thus, the **1986 Single European Act (the SEA)** was intended to achieve both the removal of non-tariff barriers to trade and the free movement of labour and capital by the beginning of 1993.

A further step towards the deepening of economic integration was taken with the movement towards a single currency culminating in the establishment of the euro area at the beginning of 1999. At the same time as integration among members has been growing, the membership has widened from the original six countries of 1957 to 25 from 1 May 2004.

In Section 21.2 we look at the objectives and achievements of the SEA and progress made towards the full achievement of the SEM. Section 21.3 looks at the attempt to achieve a **single European financial market**

while Section 21.4 considers specific sections of the financial services industry from this point of view. We look briefly at some of the implications of enlargement in 21.5. The movement to a single currency is treated in Chapters 22 and 23.

## 21.2 The objectives and achievements of the Single European Act

Objectives were set by the SEA in relation to three main types of non-tariff barriers to trade and factor mobility.

In regard to **physical barriers** created by customs formalities and controls, this included the simplification of administrative checks and their movement away from borders, the elimination of all internal frontiers and controls on people and capital as well as on goods and services and the development of a common transport policy.

In relation to **technical barriers** such as different technical specifications of products, it was intended to harmonize regulations or, failing this, to have mutual recognition of each other's standards; to remove exchange controls; and to establish the equivalence of qualifications.

Under the heading of **fiscal barriers** came the much more difficult to achieve goal of the harmonization of taxation rates and systems, especially in the fields of indirect and corporation taxes.

The SEA also stressed the desirability of opening up each country's public purchasing to competition from other member states; ensuring a firmer application of competition policy; and incorporating the social charter. However, there were no credible plans for dealing with differences in external trade policy and the Commission's attitude towards subsidies was unclear. There was also uncertainty over the degree to which **harmonization** could give way to **mutual recognition** in the completion of the single market.

The European Commission argued that the movement to a single market would produce gains of a number of types for the EU:

- 1 It would extend the static gains attributed to the removal of tariffs between countries – net trade creation. This is a measure of trade creation minus trade diversion. *Trade creation* is the replacement of high-cost domestic output of one member state by the lower-cost output of another member state. *Trade diversion* is the diversion of output from

low-cost outside sources of supply to a higher-cost source within the integrated area. It was held that the gains from the removal of non-tariff barriers might be even greater than from the removal of tariffs because governments had no revenue from non-tariff barriers to lose. Further, trade diversion was likely to be less since the removal of some non-tariff barriers (such as different product standards and definitions) would be helpful to outside producers as well as to those in EU member states.

- 2 It would produce many dynamic gains in the form of economies of scale, increased competition resulting in reductions in X-inefficiency and international price discrimination, and an increase in the variety of products available across the market.
- 3 Any gains made under items 1 and 2 would lead to increased investment both from within and without the EU, further adding to the increase in welfare attributable to the single market.

Just how large the gains would be, however, was extremely difficult to say. A major attempt was made to estimate the possible gains from the single market in a report, running to 16 volumes, prepared for the European Commission on the 'Costs of non-Europe' (Cecchini *et al.*, 1988; Emerson *et al.*, 1992). Unsurprisingly, the estimates in this report have been subject to much discussion and criticism.

The study approached the problem from both microeconomic and macroeconomic angles. The microeconomic analysis focused, sector by sector, on three types of benefits:

- 1 *direct* gains of the removal of trade barriers;
- 2 *indirect* gains of increased market integration from the removal of barriers to competition such as those connected with public purchasing and technical standards;
- 3 *efficiency* gains from the greater exploitation of economies of scale and the reduction of X-inefficiency.

The welfare effects on each sector of industry were estimated within a partial equilibrium framework in which, importantly, it was assumed that employment would remain constant. Thus, it was being assumed that workers displaced from inefficient firms would be able to move quickly and easily into other jobs. The welfare gains were estimated at between 4.3 per cent and 6.4 per cent of GDP for the EU as a whole. These were said to be cautious estimates, implying that the true effects could be yet higher.

From a macroeconomic angle, the estimated gain was 4.5 per cent of EU GDP. However, it was argued that these gains would help to ease pressures on the macroeconomic management of the economy and hence allow further gains. Taking this into account, one estimate put the likely once-and-for-all medium-term gain at 7.5 per cent of EU GDP, together with the creation of five million jobs.

These estimates were criticized as overoptimistic by several writers. It was argued, in particular, that the Cecchini gains assumed that all members would implement all directives and accept the unpleasant consequences of intensified competition without resorting to subsidies and hidden discrimination; and firms would compete and not collude or merge to avoid the extra competitive pressures. It also assumed that the Commission would be able to enforce the competition rules and that Court of Justice rulings would be obeyed by all. Many thought that all of this was unlikely.

There was criticism, too, that the report failed to take full account of the costs of the restructuring which would be needed in many economies if the SEA was to achieve its objectives. It was assumed that any resources made unemployed by the 1992 process would be fully re-absorbed by the end of 1992. Grahl and Teague (1990) and Culter *et al.* (1989) argued that some parts of the EU could experience a downward spiral in employment as a result of the SEA programme as some companies lost market share to more efficient producers in the 'core' of the EU. Cecchini ignored this possible regional effect of the SEM programme. The possibility of regional problems arising from the single market programme was, however, taken seriously and both the SEA and the 1992 Treaty on European Union talked of the need for economic and social cohesion to overcome problems of regional imbalance within the Union. Despite these concerns, there was widespread support for the move to a single European market even from people who were later much more sceptical about the possibility of gains from the movement to a single currency.

### 21.2.1 Progress towards the SEM

Frontier controls were abolished and most of the proposed legislative changes had been adopted by the Council of Ministers by the target date of 1 January 1993. However, in some areas, notably financial services, major pieces of legislation had been adopted

rather late. For example, the directive to allow for cross-frontier trade in life insurance only came into force in July 1994. Another problem, pointed out by the Sutherland Report (1992), was the slowness in the implementation of some of the directives into the national laws of the member states. Concern was still being expressed in 2004 about the slowness of some members in adopting laws aimed at creating the single market. Twice a year the European Commission publishes a scoreboard in which the speed of transposing EU directives into national legislation is recorded. In May 2003 the scoreboard showed that the Commission's transposition deficit had risen for the first time in many years – from 1.8 per cent in 2002 to 2.4 per cent. Only five of the then 15 member states met the European Council's target of a 1.5 per cent deficit. Only four countries had no transpositions outstanding for more than two years.

The report was also concerned about the increase in the number of infringement cases. When the Commission discovers an infringement by a member country of EU internal market legislation, it first issues a warning letter. If this fails to produce an adequate response, the Commission sends a reasoned opinion stating in detail what the member is doing wrongly and what needs to be done to rectify the position. If this has no effect, the Commission takes the member country to the European Court of Justice. The number of infringement proceedings has increased considerably over the past decade and will increase still further following EU enlargement. At the end of May 2003, there were 1598 open infringement cases. The Commission also remains concerned about the interferences with competition in the internal market brought about by the continued existence of differences in taxation systems and rates among member states.

There was also growing concern that laws governing the single market were not being applied equally and effectively in all member states. Penalties for breaking the laws are much harsher in some countries than in others. It is one thing to implement the laws, another to enforce them.

A completely different worry was that small and medium-sized firms and consumers appeared to have little knowledge of the new laws and this raised the possibility that the mutual recognition of technical regulations would not be widely respected. This would undermine the expected change in trade flows and limit the process of restructuring that the SEA was meant to engender. The Sutherland Report had argued

### More on the Web

For up-to-date news on the single market, go to the European Commission site: [www.europa.eu.int/comm](http://www.europa.eu.int/comm). Choose one of the 11 languages in which you are welcomed. From the headings in the centre of the page select 'internal market' (assuming you have chosen English). The page you arrive at is regularly brought up-to-date and so headings change. To find the scoreboard mentioned in the text, in June 2004 one needed to click on 'Ten years without frontiers', then 'The State of Play' and finally 'scoreboard'. However, there is much other relevant material on the internal market pages including a great deal on the Financial Services Action Plan.

that consumers' rights (for example, in relation to products that did not meet acceptable standards) needed to be more clearly specified if they were to buy goods and services from companies in other member states.

### 21.3 The single financial market (European Financial Common Market – the EFCM)

To achieve a single market in financial services, it was necessary to ensure:

- the free mobility of capital;
- the right of establishment by firms in other member states;
- the right to supply cross-border services;
- the acceptance of common supervisory regulations; and
- the harmonization of taxes.

Fully mobile capital, in turn, could only be achieved with the removal of all exchange controls, ideally the disappearance of exchange rate uncertainties and the full acceptance of the rights to raise capital and to invest in all EU markets. It was clearly always going to be difficult to meet all or even the majority of these requirements. This was especially so because the financial services industry has always been politically

sensitive and had been highly regulated everywhere. The principal reason for this was the fear of *systemic risk* – the fear that, because of the crucial importance of confidence to the industry, problems within one firm or segment of it might endanger the whole system. This magnified the importance of the question of which regulatory regime should apply when a firm opened branches in other countries or sold services across borders – the regulations of the home country of the firm (**the single passport**) or those of the host country in which the firm was locating.

National regulatory authorities preferred to oversee the prudential standards of all firms in the market, whatever their country of origin. Further, with **home-country regulation**, firms operating in one country might face regulations of differing degrees of severity, producing competitive distortions between financial firms from different countries. Again, since financial services are seen as having a central role in the economy, governments and regulatory authorities have been reluctant to allow national markets to be dominated by foreign institutions. This has led to action to prevent foreign institutions from competing with domestic financial institutions. Finally, purchasers of financial services are often thought to need high levels of consumer protection and this is assumed to be better provided by host governments.

On the other hand, national regulation created different regulatory regimes in all member states and this raised barriers to competition. **Host-country regulation** also made it easy for governments to discriminate against firms from other countries and limited foreign firms to providing the same range of services as domestic firms were allowed to offer under domestic law. Thus, host-country regulation tended to reinforce other tendencies towards a fragmented and inefficient financial services industry.

Governments worried about foreign competition for their own financial institutions had found it relatively easy to limit that foreign competition because firms generally need to locate in a country in order to provide financial services within it. This allowed governments to reduce competition by placing barriers against the establishment of branches or the takeover of domestic institutions by foreign firms. Cross-border trade from outside a country, while possible, is much less important in finance than in trade in goods. The outcome of these various forces was that although competition and integration had become international in some areas of finance such as wholesale banking,

other areas such as retail banking and insurance had remained fragmented. Even for corporate business, EU national financial systems were, by the 1980s, far from integrated, with differences remaining between them in regulation, taxation, the competitive environment and the role of the state.

### 21.3.1 The Treaty of Rome and the single financial market

The reluctance on the part of governments to give up control of financial firms operating in their national markets explained why resistance to a single European financial market was greater than in most areas of production. This reluctance was in evidence even in the Treaty of Rome itself. It is true that among the Treaty's many objectives were:

- the right of establishment – the freedom of firms to locate anywhere in the market;
- the freedom of firms to supply services across national borders; and
- the free movement of capital.

However, Article 67 of the Treaty which expressed the objective of the free movement of capital implied that this was of secondary interest, being required only to the extent needed to ensure the proper functioning of the common market. In any case, much of the force of the objectives was lost by the inclusion in the Treaty of general exceptions which ensured that the freedom to supply financial services across borders remained, in practice, limited. For instance, Article 73 of the Treaty included an escape clause allowing governments to place restrictions on capital mobility during balance of payments crises. In any case, the Treaty only specified the liberalization of payments in connection with current transactions and did nothing towards the achievement of the other requirements for a common financial market.

The chances of a movement to a single financial market were reduced still further by a ruling of the European Court of Justice that governments could impose specific regulatory requirements on cross-border suppliers of services provided that, among other things, the rules were objectively justified by the general interest and that the host country was unable to apply other, less restrictive, measures to achieve the same end (the principle of proportionality).

The first Council of Ministers directives on finance appeared in 1960 and 1962. These made some progress towards the goal of capital mobility by introducing a limited degree of liberalization of payments in connection with capital transactions. Capital movements were divided into four groups, for two of which unconditional liberalization was required. These covered transactions related to foreign trade or to foreign direct investment and operations in listed securities. A third category, including the buying and selling of unit trusts, and unlisted securities, long-term commercial credits and medium-term financial credits were granted conditional liberalization. On the other hand, governments were free to impose any restrictions they chose on the fourth category, which included dealings in money market instruments, short-term financial credits and transactions in bank deposits. Even in areas where freedom from restrictions was specified, the directives had very little impact. Although they were binding on member governments, the choice of method of achieving the end result was left to individual governments and this allowed scope for many differences in interpretation and practice.

Nonetheless, there was extensive liberalization of financial markets in the 1960s regarding direct investments, commercial credits and the acquisition of securities on foreign stock exchanges. Yet the 1970s saw this trend reversed in several member states, notably France and Italy, largely because of the turmoil in international currency markets in that decade. Consequently, the advance towards capital mobility was, until 1980, moderate, especially in comparison with the increases occurring in intra-Union trade in goods. In 1979, the UK removed all capital controls and in the following few years Germany, the Netherlands and Luxembourg followed suit. Then, as the foreign exchange markets calmed down and, in the middle 1980s, the stability of the European Monetary System (EMS) increased, exchange controls were eased in most other member states.

However, exchange controls were only one of the barriers to free capital mobility, which in turn was only one of the barriers to a single market in financial services. Despite the relative stability among exchange rates in the second half of the 1980s, significant interest rate differentials remained among member states and exchange rate uncertainties were to return in the 1990s. The free flow of capital was also hindered by differences in tax regimes among countries, particularly relating to the taxation of profits. The intra-EU

mobility of capital was also restricted by differences in capital markets. For example, the takeover of firms was more difficult in Germany than in the Netherlands or the UK. This was held to be partly because of the role of the major banks as shareholders and as the holders of proxies for other shareholders in Germany. Differences in investor and consumer attitudes may also have been important, as in the widely held, though disputed, view that institutional shareholders in the UK had a short-run attitude towards their equity investments. Such differences between the structures in the member states tended to maintain the fragmentation of the market.

Other important barriers to financial integration in Europe in the 1970s and 1980s were the limitations placed on cross-border trade in financial services and barriers to the free location of financial institutions and other suppliers of financial services. For example, although only Spain imposed limits on their establishment, formal authorization was needed everywhere for the setting up of branches by foreign institutions and, in all countries except the UK, dedicated capital had to be provided. Further, regulators and governments had placed restrictions on the acquisition by foreigners of domestic financial firms, especially where major domestic banks were the target of foreign purchase. To this end, most countries required the notification of anything more than minor shareholdings in banks. Although some progress had been achieved in specific segments of the financial services industry in the 1970s, especially in relation to the right of establishment, much remained to be achieved.

### 21.3.2 The Cockfield Report, the SEA and the change of strategy

The approach to be taken in the SEA towards the financial services industry was developed in the Cockfield Report, prepared for the European Commission in 1985. The aim was to move towards complete mobility of capital and to the integration of banking, insurance and securities trading.

The report saw the removal of restrictions on international capital mobility as an integral part of the full development of a common market in financial services but also as essential for the completion of the internal market in all its dimensions. This was argued on three grounds:

- 1 that freedom of capital was necessary for the achievement of totally integrated markets for all goods and services and also for promoting the free movement of labour across borders;
- 2 that freedom of capital would provide a powerful incentive for governments to adopt macroeconomic policies which would lead to price and exchange rate stability; and
- 3 that opening up the capital market would widen the freedom of choice for European investors and contribute to a more efficient allocation of savings.

The report also tackled the question of home country versus host country regulation. Prior to the Cockfield Report, the Commission had operated on the basis of Article 100 of the Treaty of Rome which implied that a common market in financial services could not come about until regulatory arrangements had been harmonized between members. Harmonization requires that all countries agree precisely on a common set of laws and can only take place with a spirit of compromise and much good will. However, the Treaty of Rome had also indicated that regulation would be based on host country and national principles and this gave each national authority an incentive to attempt to impose its regulatory system on other member states. Under these circumstances few were prepared to make any concessions regarding their own arrangements. The Cockfield Report argued that if a single market in financial services was to be achieved by 1992 a change of strategy was needed.

The report thus proposed the drawing of a clear distinction between what had to be harmonized and what could be left to mutual recognition of national regulations and standards. Mutual recognition had become important within the European Union as a result of a ruling by the European Court of Justice in 1979 which denied Germany the right to ban the import of *Cassis de Dijon* from France on the grounds that its alcoholic content was lower than that required by German law. The force of this ruling was that failure to meet a national law was not, in itself, sufficient reason for refusing to import a good or service from another member state. This, in turn, meant that full harmonization of national laws was not needed for the movement to a single market – all that was required was acceptance (or recognition) of each other's laws. A refusal to recognize the laws of other member states required a demonstration that to do so would cause a threat to public health or the rights of the consumer,

or would damage fiscal supervision or the fairness of commercial transactions. Mutual recognition of national laws was clearly much easier to achieve than the harmonization of them.

The Cockfield Report further proposed that in cases of mutual recognition, regulation would be based on home-country requirements. In other words, if two members had different regulations in an area in which the Commission decided that harmonization was not needed, the regulations of the country in which the financial institution was registered or licensed would apply to it no matter where it was doing business. This accepted the principle of freedom of establishment and the cross-border provision of services within the Union since an institution authorized in one country would be deemed to be similarly authorized in all other member states.

The requirement to indicate areas where harmonization was necessary meant that, for each harmonization initiative, the Commission would decide whether or not national regulations were excessive and constituted a barrier to trade. In the banking sector, for instance, it was agreed that harmonization of regulation was needed in the following areas: authorization criteria; minimum capital requirements; the definition of own funds (equity capital); large exposure limits; deposit-protection arrangements; control of the major shareholdings in banks; limits on banks' involvement in non-bank sectors; and the quality of accountancy and internal control mechanisms. Anything else could be left to mutual recognition.

### 21.3.3 The Cecchini Report and the financial services industry

The Cecchini Report foresaw a number of benefits from the movement to a single market in financial services including:

- lower prices of financial services resulting from the measures needed to complete the single market;
- an increase in general efficiency in the economy arising because financial services are a major input into industry;
- increased access to a wider range of markets, instruments and services, allowing increased portfolio diversification and raising welfare by improving the risk/return combination;
- more efficient allocation of capital, conveying generalized benefits to the economy as a whole.

The potential gains to consumers seemed to be substantial given the wide disparities in prices between member states for apparently standardized financial products. According to Cecchini, prices were likely to fall furthest in Belgium, France, Italy and Spain. The report discovered particularly wide price differences in motor vehicle insurance, home loans, consumer credit, foreign exchange drafts and most securities operations. The study considered eight countries (the original six members of the EU plus Britain and Spain) and estimated that across these countries the single market would produce an average price reduction in financial services of 10 per cent (ranging from 4 per cent in the Netherlands to 21 per cent in Spain). The potential price falls in the Cecchini Report are shown in Table 21.1. The increased competition, producing the reduced price dispersion, would, the report claimed,

increase the value added in financial services by the equivalent of 0.7 per cent of GDP.

There are three types of objection to the Cecchini estimates. Firstly, there were doubts about the way existing price differences were measured. The calculations were based on identifying standardized financial products. Each country's prices for these products were then compared with the average of the four lowest prices for the product and the discrepancies were converted into potential price falls. These were then scaled down to produce figures for expected price falls in each country, making some allowance for the fact that price differences might arise from factors other than a lack of competition. But it was arguable that this scaling down was insufficient. In practice, products cannot easily be standardized. For instance, price differences in insurance markets may reflect differences

**Table 21.1** Cecchini Report estimates of potential price falls

	Belgium	Germany	Spain	France	Italy	Netherlands	UK
<b>Banking</b>							
Consumer credit	-41	136	39	105	n/a	31	121
Credit cards	79	60	26	-30	89	43	16
Mortgages	31	57	118	78	-4	-6	-20
Letters of credit	22	-10	59	-7	9	17	8
Foreign exchange	6	31	196	56	23	-46	16
Travellers' cheques	35	-7	30	39	22	33	-7
Commercial loans	-5	6	19	-7	9	43	46
<b>Insurance</b>							
Life	78	5	37	33	83	-9	-30
Home	-16	3	-4	39	81	-17	90
Motor	30	15	100	9	148	-7	-17
Commercial, fire, theft	-9	43	24	153	245	-1	-27
<b>Securities</b>							
Private equity	36	7	65	-13	-3	114	123
Private gilts	14	90	217	21	-63	161	36
Institutional equity	26	69	153	-5	47	26	-47
Institutional gilts	284	-4	60	57	92	21	n/a
<b>Theoretical, potential price falls</b>							
Banking	15	33	34	25	18	10	18
Insurance	31	10	32	24	51	1	4
Securities	52	11	44	23	33	18	12
Total	23	25	34	24	29	9	13

Source: 'The economics of 1992: a study for the European Commission', *European Economy*, vol. 36, reproduced with permission of the European Communities (OPOCE, 1988).

in risk. Again, for many products the prices charged by banks reflect a customer's total business with the bank (relationship pricing). Thus, there are many cross-subsidies, making it difficult to isolate the price of one financial product from others. It may also be argued that the benchmark prices used for computing the potential price falls were artificial prices that existed in no one country of the union.

Secondly, the estimates implicitly assumed that observed price differences were accounted for principally by lack of competition. But wide price differences may arise also because of differences among countries in the efficiency of financial systems, regulatory taxes, the competitive environment and the extent to which economies of scale are exploited. In principle, these differences should all be attacked by increased competition but this may be limited by location, information and transaction costs. These latter are, in turn, influenced by exchange rate uncertainties. In addition, there may be different structures of cross-subsidies within banks and other financial institutions. Although some cross-subsidies may reflect differences in competitive conditions between markets, not all do so. Significant price differences are bound to remain for specific financial products within countries despite an increase in competition resulting from the removal of regulatory and other barriers.

Thirdly, the report assumed that the 1992 arrangements would raise competitive pressures in financial systems. But entry costs, scale constraints and imperfect information may cause markets to remain partially segmented.

We have already noted the possible impact of national differences in the structure of capital markets. It may be the case that national or regional differences

in consumer tastes are less pronounced in the field of financial services than in other products. On the other hand, the importance to people of many single financial decisions and the consequent fear of loss may increase consumer loyalty to local firms.

Thus, although there was no doubt that the changes introduced in the SEA and the subsequent directives would compete away some existing restrictive practices and collusive agreements and overcome some protective regulatory arrangements, the Cecchini figures for gains to consumers were optimistic.

### 21.3.4 The EFCM and the periphery

Just as there has been a general concern about the impact of the move to a single market on the peripheral (poorer) members of the EU, particular worries have surfaced with regard to the movement to a European Financial Common Market. With regard to the peripheral countries, it has been argued that the movement to a single financial market across Europe may produce either of two outcomes. The relatively low profits of peripheral country banks may discourage the restructuring of the European banking system (Grilli, 1989), leaving peripheral banking systems relatively underdeveloped with many banks remaining essentially regional. This would accentuate the differences between core and peripheral countries and could increase the financial fragility of the peripheral countries since banks with a narrow base are more at risk from external shocks because of their inability to diversify.

Alternatively, restructuring may occur with core country banks taking over banks within the periphery (Gibson and Tsakalotos, 1993). This may have a variety of consequences for the periphery, including the reduction of specialist regional advice and service within the periphery as the 'over-branched' peripheral banks are slimmed down in search of efficiency gains and better profit performance. The accompanying centralization of bank administration and decision making may also lead to a large reduction in available knowledge of the riskiness of potential borrowers. This too may increase the risks of financial fragility or may produce credit rationing, making it more difficult for small entrepreneurs to obtain funds for investment. In either case, banking developments could contribute to a widening of real income differences between rich and poor member states.

#### More from the web

The EU itself publishes a mountain of material on the internal market. However, there are also many other useful sites. For example, for the application of the Financial Services Action Plan to the UK see the website of the Financial Services Authority [www.fsa.gov.uk/](http://www.fsa.gov.uk/). Click on 'Publications' and then 'Other' to find the heading for the FSAP. Also, try the UK Treasury website [www.hm-treasury.gov.uk/documents/financial\\_services/](http://www.hm-treasury.gov.uk/documents/financial_services/). There you will find a heading for European Union Financial Services.



However, none of these worries have led the poorer countries to oppose the movement to the EFCM. They have obtained derogations with regard to a number of directives to allow them to delay implementation for some years but have generally put their faith in enhanced regional policies and the new concern for economic and political cohesion in the EU.

## 21.4 Progress towards the EFCM

### 21.4.1 Freedom of capital movements

The Single European Act (1986) set the end of 1992 as the date for removal of all controls and in 1985 and 1986 liberalization rules were agreed which removed all restrictions from the third category of capital movements under the 1960s directives, such as the buying and selling of unit trusts and unlisted securities. The *Capital Liberalization Directive*, adopted in June 1988, then completely liberalized all capital movements. Eight of the then 12 member states were given until July 1990 to achieve this. Spain, Portugal, Ireland and Greece were allowed until the end of 1992 to meet the terms of the directive, with Greece and Portugal permitted to apply for a further extension to 1995. Despite some reinstatement of controls following the EMS crisis in 1992, progress continued to be made in these four countries and the addition of Sweden, Finland and Austria to the union caused no further problems in this regard. Under the Treaty on European Union, the old capital mobility articles of the Rome Treaty were scrapped. The new provisions prohibit all restrictions on the movement of capital and on payments between member states. The safeguard clauses which had been retained in the *Capital Liberalization Directive* were removed and even restrictions on capital movements and payments between member states and non-member states were prohibited. Only one escape clause remains and this only relates to movements of capital to and from non-member states.

The complete freedom of capital movements is by no means an unmixed blessing and arguments have been made in recent years for taxing the international movement of capital in an attempt to restore to governments some control over their macroeconomic policies. However, if one views capital mobility strictly in terms of the movement to a single European market in financial services, it had to be regarded as essential.

Clearly, a major element in it has now been achieved. A further step towards full capital mobility was taken with the adoption of a single currency by 11 EU members from January 1999, with Greece becoming a twelfth member in January 2001. The consequent removal of exchange rate risk brought interest rates rapidly into line across the euro area. In March 1997, Eurocurrency interest rates were between 3 and 4 per cent higher in Spain, Portugal and Italy than in Belgium, Denmark, Germany, the Netherlands and France, and were higher still in Greece. However, by 2004 interest rate differences across the euro area had been greatly reduced, as can be seen in Table 21.2. This shows the bid yields on benchmark government bonds. Two bonds are quoted for each country – one maturing in the next 1–3 years and one with around 9 to 10 years to maturity. Section A of the table shows that among the euro area countries the very small differences in bid yields could be explained almost entirely by the slightly different periods to maturity. However, this is not quite the case for EU members outside the euro area. In particular, the higher yield on UK bonds reflects higher domestic interest rates and these, in turn, reflect continuing exchange rate risk.

Some interest rates, such as on consumer loans to households, continue to vary from country to country but this is largely because the conditions attached to these types of loans vary among countries.

### 21.4.2 The banking industry

The banking industry was one of the most highly regulated industries in the EU and operated with widely varied regulatory practices. In general, barriers to the supply of cross-border services were more of a problem than those related to location. In some countries laws and regulations restricted the right of non-resident banks and financial institutions to conduct business with residents.

Prior to the SEA, there had been two major directives relating to the banking industry: the *First Banking Directive on Coordination of Regulations Governing Credit Institutions* of 1977; and the *1983 Directive on the Supervision of Credit Institutions on a Consolidated Basis*.

The *First Banking Directive* required member states to establish systems for authorizing and supervising banks and other credit institutions that take deposits and lend money. It required such institutions to be

**Table 21.2** Coupon rates and bid yields on benchmark government bondsA. of euro area members<sup>1</sup>

Country	Redemption Date	Coupon %	Bid yield %
Austria	7/2006	5.88	2.53
	1/2014	4.3	4.23
Belgium	9/2005	4.75	2.27
	9/2014	4.25	4.26
Finland	7/2006	2.75	2.5
	7/2013	5.38	4.09
France	1/2006	5.0	2.35
	4/2014	4.0	4.19
Germany	3/2006	2.0	2.37
	1/2014	4.25	4.12
Greece	6/2007	3.25	2.90
	5/2014	4.50	4.34
Ireland	10/2007	4.25	2.96
	4/2013	5.0	4.09
Italy	12/2005	5.25	2.35
	8/2014	4.25	4.35
Netherlands	7/2006	3.00	2.53
	7/2014	3.75	4.22
Portugal	7/2006	3.0	2.57
	6/2014	4.38	4.28
Spain	1/2006	3.2	2.35
	7/2014	4.75	4.2

B. of EU members<sup>2</sup> not in euro area

Country	Redemption Date	Coupon %	Bid yield %
Denmark	3/2006	8.0	2.54
	11/2013	5.0	4.29
Sweden	4/2006	3.5	2.72
	5/2014	6.75	4.52
UK	11/04	6.75	4.3
	09/2014	5.0	4.95

<sup>1</sup> not including Luxembourg<sup>2</sup> does not include new EU members from 1 May 2004Source: *Financial Times*, 20 April 2004, p. 43.

licensed. Once licensed, they would be allowed to conduct business in other member countries provided they were authorized to do so by the host government and complied with the conditions and supervision applied to local banks. To be authorized, a credit institution was required to have separate capital from its owners, to meet an initial capital requirement, and to have at least two directors and a reputable and experienced management. However, authorization could not legally be withheld on the sole ground that the head office was in another member state. As we have seen, the host country principle on which the directive was based meant that a German bank in Spain, for example, could only do what Spanish laws allowed its own banks to do in Spain.

The *Directive on the Supervision of Credit Institutions on a Consolidated Basis (1983)* established the common principle that bank activities were to be supervised on the basis of their worldwide activities. Thus, capital requirements were to relate to their global balance sheet position, preventing banks from seeking to avoid capital requirements by arranging business through less strictly regulated financial centres. This derived from the growing international concern with the solvency of banks, particularly at the commencement of the international debt crisis of the developing countries.

Since the SEA, there have been a series of directives on the banking industry, most notably the *Second Banking Coordination Directive*, which came into force on 1 January 1993. This was based on the Cockfield Report strategy of home-country regulation and mutual recognition. It gave the right to banks to establish branches and to trade in financial services throughout the EU on the basis of a single licence obtained from the home-country authorities. The directive included some exceptions to home-country control. Host countries retained the right to control bank liquidity for monetary policy purposes and had to comply with host-nation consumer protection and similar laws in the public interest. There was some ambiguity in relation to the scope of the consumer protection qualification. However, the directive eliminated the requirement for branches of foreign banks to maintain dedicated capital for their local operations.

The directive covered much else. It set out a detailed list of bank activities to which the directive applied. This, as is shown in Box 21.1, was very broad and included much of what is generally included under the heading of securities or investment business in addition

**Box 21.1 What a universal bank might do**

According to the EU's Second Banking Directive, EU banks may engage in all of the following activities:

- 1 Acceptance of deposits and other repayable funds from the public
- 2 Lending to include consumer credit, mortgage credit, factoring, financing of commercial transactions (including forfaiting)
- 3 Financial leasing
- 4 Money transmission services
- 5 Issuing and administering means of payment (for example credit cards, travellers' cheques and bankers' drafts)
- 6 Guarantees and commitments
- 7 Trading for own account or for account of customers in:
  - (a) money market instruments (cheques, bills, CDs, and so on)
  - (b) foreign exchange
  - (c) financial futures and options
  - (d) exchange and interest rate instruments
  - (e) transferable securities
- 8 Participation in share issues and the provision of services related to such issues
- 9 Advice to undertakings on capital structure, industrial strategy and related questions, and advice and services relating to mergers and the purchase of undertakings
- 10 Money broking
- 11 Portfolio management and advice
- 12 Safekeeping and administration of securities
- 13 Credit references services
- 14 Safe custody services.

Source: The Second Banking Directive 89/646/EEC (*Official Journal* of the EC, L386, Vol. 12, 30 December 1989, Annex).

In short, banks may participate in all activities considered in this book (with the exception of central banking) and a good deal besides.

to activities more widely considered as banking. This accepted the principle of universal banking on which the German banking industry was organized.

The directive established the right of banks with head offices in other EU countries to pursue all the listed activities in a host country, including those that host-country laws might forbid to local banks. Essentially, banks were allowed to participate fully in securities business either directly or through subsidiaries. Nonetheless, despite the apparently comprehensive nature of the list, difficulties of interpretation remained. For example, Davis and Smales (1990) raised the question of variable-rate mortgage lending which was legal in the UK but not in Belgium. If this were regarded as a technique, Belgium would be required to allow UK banks to market the product in Belgium. On the other hand, if it were regarded as a basic activity, Belgium could prevent UK banks from marketing it under the consumer protection exception since it was not listed separately from mortgage lending. This is a difficulty associated with any listing that attempts to be comprehensive, especially in a period of rapid change and innovation. Difficulties associated with the regulation of banks engaged in both banking and securities business are discussed in Chapter 25.

The directive included rules regarding the exchange of information between home- and host-country regulators and harmonized minimum standards of authorization and prudential supervision. This included setting minimum requirements for the size of own funds (equity capital) – credit institutions were required to have initially and to maintain capital of at least Ecu5 million. The authorities in all countries were given the right to supervise ownership and control to prevent cross-financing and conflicts of interest. Hence, disclosure of the identity of a bank's most important shareholders was required and limits on banks' shareholdings in other financial and non-financial companies were harmonized.

A number of other directives, ancillary to the *Second Banking Directive*, were approved in 1989 and later years in order to meet the harmonization requirements for banking. Box 21.2 lists these directives.

### 21.4.3 Securities markets

A genuine single financial market across the EU needed to apply much more broadly than to banking. It was accepted that if competition were to be fair for all firms

### Box 21.2 EU banking directives

The principal ancillary banking directives to the Second Banking Coordination Directive have been:

- Own Funds Directive
- Bank Solvency Ratio Directive
- Second Consolidated Supervision Directive
- Money Laundering Directive
- Annual and Consolidated Accounts Directives
- Large Exposures Directive
- Deposit Guarantee Directive
- Market Risks Directive

They aimed at providing a common regulatory framework for banking. The first five all came into force from 1 January 1993 together with the *Second Banking Directive*. The *Own Funds Directive* and the *Bank Solvency Ratio Directive* were concerned with the adequate capitalization of banks. The *Own Funds Directive* harmonized the definition of the minimum capital base of credit institutions. The *Bank Solvency Ratio Directive* harmonized the minimum prudent solvency ratio for banks. Both directives followed the principles and figures set out in the Basle capital adequacy rules of the Bank for International Settlements, discussed in Chapter 25. The *Money Laundering Directive* set out requirements for the transparency of banking conditions relating to

cross-border financial transactions. There were two directives on bank accounts. One described the layout, nomenclature and terminology for bank balance sheets, profit-and-loss statements and consolidated accounts of banks and greatly improved the comparability of bank accounts across member states. The second laid down the accounting obligations of bank branches of foreign banks in member states.

The *Large Exposures Directive* (in operation since the start of 1994) strengthened the capital adequacy provisions in the other directives by requiring credit institutions to report annually on all large exposures to individual borrowers amounting to more than 15 per cent of their own funds (equity capital) or of the largest exposures, even if less than 15 per cent. The *Deposit Guarantee Directive* has since January 1995 required members to establish deposit guarantee schemes, financed by banks, to protect depositors in the event of a credit institution's financial collapse. Finally, rules on the monitoring of market risks incurred by credit institutions were incorporated into a directive operative from January 1996.

These various directives were consolidated into a single text in 2000. Details are available at [www.europa.eu.int](http://www.europa.eu.int). Point at 'Documents' and choose 'Summaries of Legislation' and then 'Internal Market'.

across the EU, free access was required to all sources of capital. It was also accepted that if savings were to be utilized as effectively as possible, investors should have free access to all investment products irrespective of their country of origin. With the very rapid development of financial markets and the great increase in new financial products from the early 1970s onwards, the securities (or investment) industry (which covers securities trading, unit trusts, broking and market making, portfolio management, underwriting and investment advice as well as issues related to the access of companies to foreign stock exchanges and the quotation of securities on foreign stock exchanges) was becoming increasingly significant. However, it was also an area in which markets developed much more rapidly in some member states than others. This caused anxiety in some countries that increased competition across the EU would damage, if not destroy, their underdeveloped markets and institutions. Under these circumstances, progress towards a single market was bound to be slow.

Nonetheless, strong efforts were made in some segments of the industry from the late 1970s on, notably in regard to the harmonization of the different regulations of the member states on the admission of securities to stock exchange listing and the information provided to investors. In 1979, the *Directive Coordinating the Conditions for the Admission of Securities to Official Stock Exchange Listing* set out the minimum conditions to be met by issuers of securities, including minimum issue price, a company's period of existence, free negotiability, sufficient distribution, and the provision of appropriate information to investors. Member states were free to impose stricter requirements. This was the first of four directives (the others followed in 1980 and 1982) which were designed to make it easier for companies to list their shares or raise capital on other EU stock exchanges. Directives concerned with information to investors covered the disclosure of large shareholdings in companies, the provision of information in prospectuses and insider dealing.

The new SEA principles of minimum harmonization, mutual recognition, a single passport and home-country regulation were applied in two directives on the marketing of unit trusts in 1985 and 1988. These allowed a unit trust which had been approved in one member country to be sold anywhere in the EU without further authorization provided it met investor protection requirements in force in the host country.

The first major securities industry directive based on SEA principles was the *Investment Services Directive* which came into force in June 1992. It extended the single passport principle to non-bank investment firms generally. This extension was essential because the *Second Banking Directive* had given this right to banks carrying out securities business but did not grant it to non-banks in this area. There was a particular problem because, as we have noted, the banking industry in some member states had traditionally been organized on universal banking principles whereas in other member states (notably the UK), the two forms of business had been separated. Thus, if the *Investment Services Directive* had not been agreed, banks engaged in securities business would have been given a competitive advantage over non-bank firms. The *Investment Services Directive* thus provided for the removal of barriers to both the provision of cross-border securities services and the establishment of branches throughout the EU for all firms. It also liberalized the rules governing access to stock exchanges and financial futures and options exchanges.

The difference in the organization of banking and securities industries among member countries led to problems in relation to capital adequacy. If capital adequacy rules had not been extended to cover non-bank securities firms, then they, in their turn, would have been given a competitive advantage over banks engaged in securities business who were required to meet capital adequacy rules. However, as we explain in Chapter 25, it was widely argued that the same rules should not apply to both forms of business. This ultimately led to the *Capital Adequacy Directive* of 1993 which applied to both investment firms and to the securities activities of banks.

#### 21.4.4 Insurance Services

As with other financial services, the insurance industry has typically been highly regulated. There are particular reasons for this in the nature of some kinds of

insurance. Firstly, specifically in the area of life insurance, contracts are very long term with the consequence that a policyholder faces a significant default risk, especially since the insurance companies themselves face major problems in the assessment of risk and maturity transformation. But information on the ability of a company to meet its financial obligations many years ahead is difficult to come by and expensive.

Secondly, the risks being insured may be very large relative to other aspects of a policyholder's annual or even lifetime income. Few people are sufficiently wealthy to be able to afford not to have their house or even their motor vehicle insured. Third-party payments on motor vehicle accidents are potentially so large that insurance against it is a legal requirement for drivers. The failure of a pension or superannuation fund can make a very great difference to the comfort of people in old age.

Thirdly, the nature of the product is far from transparent. The complexity of the risks being insured and of the terms of settlement of contracts means that the problem of 'the small print' in contracts is of more importance in insurance than in most mass consumer industries and that open and honest professional advice is a crucial element of the industry. Consumer protection is thus a very important issue in insurance.

It is not surprising, then, that there has always been a tendency to regulate the insurance industry quite tightly. The special features of insurance have also, until quite recently, favoured local insurance companies. Consumers have, on balance, felt more confident in assessing the reliability of local companies. Equally, until insurance companies became very large and began to act entirely on the basis of probability, there were advantages for domestic over international companies. The result of all of this has been that legal barriers have strongly reinforced other factors in the fragmentation of insurance into a number of relatively isolated national markets. With the exception of reinsurance, which deals with very large and often international risks, the insurance industry has, in all EU countries other than the UK, been well protected from foreign competition.

From the beginning, the European Commission acknowledged the additional problems associated with the long average length of contracts in life insurance by the issuing of separate directives for life and non-life insurance. Hence, 1973 saw the promulgation of the *First Non-Life Insurance Directive*. The *First Life Insurance Directive* followed in 1979. Both of

these directives followed the principle of host-country regulation. They established the right for companies to operate in other member states but harmonization of regulations across the EU was very slow. Several members strongly resisted attempts to open up their insurance markets to greater competition. In Germany, for example, non-German firms were required to have a local establishment and were taxed at rates that the European Commission considered discriminatory. In 1986 the European Court of Justice made a ruling that the restrictions imposed on insurance companies from other member states by Germany, France, Ireland and Denmark were partly illegal. In particular, the Court attacked the practice of requiring establishment and local authorization before a company could participate in the co-insurance of large risks situated outside of its home country.

The court ruling, together with the increased role for qualified majority voting introduced in the Single European Act, encouraged the European Commission to attempt to incorporate the home-country regulation principle into insurance directives. They were, however, inhibited from replacing the requirement of full harmonization of the rules regarding the authorization of companies by mutual recognition because of the sensitivity of the consumer protection issue in a significant part of the insurance industry. Consumer protection was, remember, one of the areas which, under the 1979 *Cassis de Dijon* court ruling, could be used to justify the rejection of the standards applied by other member states.

The Commission tackled the problem by following the 1986 Court of Justice ruling that had made a distinction between the insurance of large risks (including all marine, transport and aviation risk) and small commercial risks and personal insurance. Whereas host-country regulation was preserved for the latter category, the Commission felt able to apply the home-country regulation principle to the former category on the grounds that large companies or people responsible for insuring large risks are much better able to collect and assess information about insurance companies than is the average consumer.

Thus, in the *Freedom of Services Directive for Non-Life Insurance*, for small-risk business the regulations of the country in which the policyholder resides apply while for large-risk business the regulations of the country in which the company is licensed apply. Large-risk business was defined to cover policies for companies with more than 500 employees or more than

£15 million turnover. Motor insurance was brought within the scope of the Non-Life directive by the *Motor Insurance Services Directive* of 1990.

The distinction between large and small risks could not be made in the *Second Life Assurance Directive* and so a different distinction was made to bring in an element of home-country regulation. Host-country regulation applied except where the initiative for a cross-border policy came from the policyholder rather than the company – then the home-country regulation principle applied. Should the initiative for a cross-border policy come from the insurance company, on the other hand, host-country rules would apply and the provisions applicable would be those of the country in which the risk was situated. Host countries also retained responsibility for the regulation of branches of foreign companies, although ‘well-established’ companies covering large risks were, under the terms of the directive, simply required to notify the host authorities of their intention to provide services in the host country.

Despite continued resistance from some members and problems over the distortion of competition by different tax relief treatment on premiums, the Commission pushed ahead and in July 1994 the *Third Non-Life Insurance Directive*, the *Third Motor Insurance Directive* and the *Third Life Assurance Directive* came into force, introducing the full single passport, home-regulation regime to the insurance industry, although derogations gave extra time for implementation, ranging from the end of 1995 to the end of 1998, to Spain, Portugal and Greece. Although home-country regulation applies, a role remains for host institutions. In practice, most insurance companies establish a local presence because of the need to provide follow-up customer sales and service. Local rules on sales techniques and advertising apply but cannot be used to discriminate against foreign companies. In certain circumstances, host states can exercise control over particular products, for instance mandatory third-party motor insurance. Finally, policyholders are protected by the application of domestic contract law.

#### 21.4.5 The Financial Services Action Plan

In the late 1990s the European Commission remained concerned over progress towards a common financial market. Legislation was still required to overcome interferences with competition across the market. Member

states were being slow in implementing the existing directives and there were inconsistencies in the way different members were implementing them. The hoped-for benefits of an integrated financial market were being slow to appear. In retail financial markets, for instance, the expected gains in terms of the reduction in disparities in prices for financial services among members had not been forthcoming. As an example, the Commission reported that fixed commissions for private equity transactions were still 17 times more expensive in the dearest member state than in the cheapest.

Consequently, the **Financial Services Action Plan (FSAP)** was developed. The aim of the plan was to put in place a series of measures to ensure deep and liquid capital markets and to remove the remaining barriers to the cross-border provision of retail financial services. There were three elements in the strategy adopted by the Commission:

- to develop a flexible approach to prudential and other rules to ensure that legislation could be adapted to the rapidly changing needs of financial institutions and markets;
- to introduce some additional legislation notably in relation to pension funds and consumer compensation;
- to achieve more satisfactory enforcement of the existing rules through higher rates of implementation of directives and more uniform interpretation of EU legislation.

Separate plans were developed for wholesale and retail financial markets and in relation to the issues of supervisory cooperation and taxation. Areas of concern to the Commission included:

*Wholesale markets* – prospectuses for the public offering of equities; the financing of small business start-ups; investment restrictions on supplementary pension funds; financial reporting; problems arising from the *Investment Services Directive*; and takeover bid procedures.

*Retail financial markets* – the restriction of host-country requirements to private individuals; the transparency of host-country rules relating to consumer protection; the level of consumer compensation and the handling of consumer complaints; the need to increase consumer confidence in financial services; safeguards relating to the behaviour of insurance intermediaries; and the adoption of proposals on electronic money and the distance selling of financial services.

*Supervisory cooperation* – increased coordination between the different supervisory bodies across the EU; ensuring conformity of banking supervision rules with those of the Basel Committee; prudential problems posed by financial conglomerates; and the adoption of proposals relating to the winding-up and liquidation of banks and insurance companies.

*Taxation* – tax distortions to the allocation of savings and harmful taxation competition between financial centres; and the taxation of financial products preventing cross-border marketing, particularly obstacles to cross-border membership of pension funds.

Other issues mentioned included systemic risk, fraud, money laundering and the need to enforce rules on competition and state aid. The Financial Services Action Plan identified 42 possible measures to be taken – a mixture of new directives, amendments to directives, political agreements, Commission communications and recommendations and the application of existing regulations. The tenth report of 2 June 2004 on the FSAP showed that 39 of the 42 measures had been completed. This was regarded as a success but it was noted that many of the measures had yet to be implemented by member states and that this needed to be done promptly and consistently. A continued need for the convergence of national supervisory practices and rigorous enforcement was also pointed out.

In 2000 the Council of Finance Ministers had also asked the Commission to develop indicators to assess the state of financial integration. In response, the Commission published in May 2004 the first report of the **Financial Integration Monitor**. This showed increased financial integration across the internal market but, as the Commission commented, it was difficult to know to what extent this was the result of the Financial Services Action Plan, rather than the introduction of the euro, cyclical factors or technology. At the same time, the Commission published reports by four independent groups of experts on the state of financial integration in the areas of banking, insurance, securities and asset management. The reports concluded that legislation undertaken under the Financial Services Action Plan had not yet produced improvements in market access or the easier organization of cross-border financial business.

The general conclusions of the first report of the Financial Integration Monitor were that although much had changed in European financial markets over the previous decade, some features of the markets had

remained unaltered. Thus, market-based financing had gained in importance, financial markets had become more liquid and there had been an increase in the range of financing techniques and products but bank lending remained the predominant source of external finance in the EU15. Again, all member states had shared in the broadening and deepening of European financial markets but important differences remained among the national markets. Two of these were noted in particular:

- the three principal sources of finance (bank loans, securities and bonds) play a different role as a source of finance in the different member state economies;
- there are marked differences between countries in the products used (pension, insurance and mutual funds) to manage the long-term savings and pensions of households and employees.

### 21.5 Enlargement to 25

On 1 May 2004, the EU grew from 15 to 25 members with the inclusion of the Czech Republic, Poland, Hungary, Slovakia, Slovenia, Latvia, Lithuania, Estonia, Malta and Cyprus.<sup>1</sup> Entry negotiations had begun in 1998 with the applicant countries being required to meet the conditions established by the EU in 1993 (the Copenhagen criteria). These were:

- the existence of stable institutions guaranteeing democracy;
- the rule of law, respect for and protection of human rights and minorities;
- the existence of a functioning market economy;
- the capacity to cope with market forces and competitive pressures within the Union; and
- the ability to take on the obligations of membership, including economic and monetary union.

Entry treaties were signed in April 2003 and these were ratified in the new member countries following the holding of national referendums. Preparing for membership required the new countries to accept the 80,000 pages of EU law (the *acquis communautaire*), to

improve their administrative, bureaucratic and judicial systems and to tighten security at the new external borders of the EU. The EU15 provided financial and administrative help in this process. Many of the EU programmes and policies apply to the new member states immediately but others are to be phased in through transitional arrangements. Full integration is expected by 2007.

It is impossible at this point to assess the impact of this expansion. The new members are a mixture of large and small countries but the overall effect is to add considerably to the size of the internal market. Several of the new members have per capita incomes well below the average of existing EU members, giving rise to a number of fears in both the new and old member countries. These relate particularly to the movement of labour, the ability of agriculture in the new member countries to compete, the buying up of property in the new member countries, and the problems associated with developing a new European constitution to allow the effective working of the various EU institutions.

Transitional arrangements apply to many elements of financial integration although the new members accepted the same implementation deadlines for all FSAP measures as did the older members. However, the European Commission accepts that the enlargement will accentuate the diversity of financial structures and levels of financial development as well as increasing the number of infringements of EU directives.

### 21.6 Summary

Progress towards a fully integrated European economy had begun to slow down by the early 1980s. Although tariffs among member states had been removed, there were still many barriers to intra-EU trade. The removal of these barriers would increase competition and allow the fuller exploitation of economies of scale, leading to increased efficiency, lower costs, and higher levels of investment and rates of economic growth. The Single European Act, 1986 thus sought to deepen integration through the removal of all non-tariff barriers to trade in both goods and services and to the mobility of capital and labour.

<sup>1</sup> This excludes, for the present at least, the Turkish-ruled northern part of the island of Cyprus.



Estimates were made of considerable welfare gains which would accrue to Europe through the movement to the single market and these were published in the Cecchini Report. Criticisms followed that the estimates were overly optimistic and that regional and structural problems might result. Nonetheless, there was widespread acceptance of the single market programme.

The removal of barriers to trade within financial services and to the mobility of capital had been even slower than in other areas of the European economy. One major reason for this lay in the unwillingness of national regulatory authorities to cede control of activities in their own national markets. This had led to progress in the harmonization of regulations across the EU being very slow. To speed up the movement to a single financial market, a change of strategy was incorporated in the Single European Act. The objective of complete harmonization of regulations was

replaced with the much more easily attainable mutual recognition of national standards and regulations. A second major change was the move from host-country regulation of the firms of other member states within a country to home-country regulation. This allowed a company to operate anywhere within the EU on the basis of a single licence obtained from the regulatory authorities in its home market.

These new principles were incorporated in directives aimed at the creation of a single market in the three categories of financial services – banking, the rapidly growing securities market and insurance. Despite the progress made since 1998 under the Financial Services Action Plan, there is still much to be done in terms of the implementation into national law of all existing directives, and the enforcement of single market laws at a national level before the major gains foreseen from a European Financial Common Market are realized.

### Key concepts in this chapter

Single/internal market	Single European Act (SEA)	Single financial market
Physical barriers to trade	Single European Market (SEM)	Host-country regulation
Technical barriers to trade	Financial Services Action Plan (FSAP)	Mutual recognition
Home-country regulation	Fiscal barriers to trade	Financial Integration
Harmonization		Monitor
Single passport		

### Questions and problems

- 1 What disadvantages do you see in the movement to the SEM?
- 2 List as many technical barriers to trade as you can think of.
- 3 Why is the measurement of gains from the movement to a single market so difficult?
- 4 What was special about the financial services industry which led progress towards the harmonization of national laws to be so slow?
- 5 List the arguments in favour of host-country regulation and discuss them. Why did the European Commission favour home-country regulation?
- 6 Have you seen examples in your town or region of the development of a single European financial market?
- 7 What is meant by systemic risk in connection with the banking industry?
- 8 Why is consumer protection such an important issue in insurance?

## Further reading

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[www.hm-treasury.gov.uk](http://www.hm-treasury.gov.uk)

## Chapter 22

# The European Monetary System and monetary union

### *What you will learn in this chapter:*

- The background to and the early history of the EMS
- The plans for monetary union in the Maastricht Treaty
- The principal reasons for the ERM problems in the early 1990s
- The nature of the movement to the European single currency
- An understanding of the issues concerning future membership of the monetary union

## 22.1 Introduction

The European Monetary System (EMS) was established in 1979 for a mixture of economic and political reasons. The central element in the system was the **Exchange Rate Mechanism (ERM)**, a fixed exchange rate arrangement that sought to restrict the extent to which volatile exchange rates interfered with fair competition among EU producers. From an economic viewpoint, fixed exchange rates became essential once the International Monetary Fund's fixed exchange rate system had started to come under pressure in the late 1960s. Under the IMF system, the exchange rates of EU countries could vary against each other by a maximum of  $\pm 2$  per cent.<sup>1</sup> However, in August 1969, the French franc was devalued by 11.11 per cent and later the Deutschmark was revalued by over 9 per cent. In December 1971, the band that each currency had to maintain against the dollar was increased to 2.25 per cent, widening the allowable variation in the value of one European currency against another to  $\pm 4.5$  per cent. The combination of the wide band and possible changes in the exchange rate parity was thought to interfere too much with the fairness of competition among producers in different EU states and to raise the possibility of countries acting to push down the relative values of their currencies in order to improve the competitiveness of their industries.

Volatile exchange rates also caused a specific problem for the Common Agricultural Policy (CAP) of the EU. The policy had been designed in the 1960s on the assumption that the exchange rates among the EU currencies would remain unchanged. Prices in the CAP were fixed in terms of the EUA – the European Unit of Account, the forerunner of the Ecu. A fall in the value of the franc, say, against the dollar and the EUA meant that farm prices in France would rise in terms of French francs but remain the same elsewhere. This would give French farmers an advantage over other farmers within the Union and encourage them to increase production, adding to the already strong incentives for European farmers to overproduce. In 1971 a formal system of levies and subsidies (known as MCAs – Monetary Compensatory Amounts) was

introduced. This established a dual system of exchange rates – the actual market rate and the Green rate of exchange which was used to convert farm prices set in EUAs into national currencies. Countries whose market exchange rates fell below their Green rates would pay MCAs, those whose market rates rose above their Green rates would receive MCAs. Although MCAs adjusted to some extent for the exchange rate changes in terms of fairness, these modifications to the CAP meant that there was no longer a system of common prices throughout the Union.

Although the Treaty of Rome had contained nothing about monetary **integration**, there had always been considerable support on political grounds for the idea that monetary integration should eventually occur. Proposals for steps to be taken towards a single currency and single monetary policy were made as early as 1961. Serious discussion of monetary integration began at The Hague summit in December 1969 and this was followed in 1971 by the Werner Committee report which recommended the achievement of **monetary union** by 1980. Any possibility that this might happen was removed by the volatility of exchange rates following the complete breakdown of the Bretton Woods system in 1972.

This also destroyed any chance of success for the system of fixed exchange rates, known as the **Snake in the Tunnel**, which was established in Europe in April 1972 and struggled on until March 1979, when the EMS replaced it. The Snake attempted to limit the freedom of European currencies to move against each other to  $\pm 2.25$  per cent around the established **central rates** – half the freedom that had been possible under the modified IMF arrangements. However, only Benelux, West Germany and Denmark remained members of the Snake for the seven years of its existence. At various times, France, the UK, Sweden, Norway and Italy all entered and left. The 'fixed' parities were altered 31 times.

Details of the exchange rate mechanism of the EMS are provided in Box 22.1.

An attempt was made to allow for the problems of particular countries by requiring those that had not survived within the Snake to maintain the value of their currency within a very wide band of  $\pm 6$  per cent

<sup>1</sup> All currencies were required to remain within a band *against the US dollar* of  $\pm 1$  per cent, which meant that all non-dollar currencies could vary against other non-dollar currencies by  $\pm 2$  per cent: with at times currency A being 1 per cent above its parity with the dollar and currency B being 1 per cent below its dollar parity; while at other times the reverse might apply.

**Box 22.1 The Exchange Rate Mechanism of the EMS**

The ERM was based on a **parity grid** which tied each currency to every other currency in a system of mutually agreed and consistent rates. Under a parity grid, whenever a currency diverges from parity, all other exchange rates also diverge from the agreed rate. Hence, all countries must respond to bring about the re-establishment of parity. It was thus intended that the burden of maintaining the fixed exchange rate system would be shared equally among all members; those with strong and weak currencies alike. Central rates (parities) in the EMS were established against the European Currency Unit (Ecu), a weighted average of the value of the currencies of all EU members.

As the system operated from its inception in 1979 until the collapse early in August 1993, each of the currencies in the ERM had to stay within a band either of  $\pm 2.25$  per cent (narrow band) or  $\pm 6$  per cent (broad band) around its central rate against the Ecu (at the time of the collapse, the peseta and the escudo were the only two of the nine currencies within the broad band). In August 1993, the band for all members was widened to  $\pm 15$  per cent, although Germany and the Netherlands agreed separately to retain the old narrow band for the relationship between their currencies.

The parity grid, showing the required relationship of each country against every other currency in the mechanism, was derived from the central rates of each currency against the Ecu. In addition to being required to stay within its band against the Ecu, each currency had to stay within the same band against every other currency. In practice, currencies under pressure within the mechanism fell out of their bands against individual currencies before they fell out of their bands against the Ecu.

Intervention points were calculated at 75 per cent of the permitted divergence of a currency from its central parity against the Ecu. When a currency reached an intervention point, the central bank in question was required to intervene in the market, buying or selling its own currency in order to keep the currency within its band. Adjustments to central parities were allowed from time to time, although these were meant to stop under Stage II of the EMU process.

around the central rates that were established against the Ecu.<sup>2</sup> Despite this attempt at increased flexibility, the mechanism faced many early problems and seven adjustments were made to central rates in the first four years. After much talk in 1982 and early 1983 of French withdrawal and of the system's virtual collapse, things began to settle down and there were only three further realignments prior to the general realignment of January 1987. Towards the end of this period of relative exchange rate stability, talk began to be heard again about the possibility of a movement to monetary union. Box 22.2 summarizes this last section by showing the changes in central parities in the ERM between 1979 and 1996.

The period up until September 1992 was one of capital liberalization and a determined attempt to achieve exchange rate stability as a step towards monetary union. The only change in central rates in over 5½ years was a small reduction in the central rate of the lira to allow it to move from the  $\pm 6$  per cent band to the  $\pm 2.25$  per cent band. There was growing

evidence of inflation rates among members converging on the lower rate of inflation experienced by Germany. For several countries, this convergence of inflation rates was accompanied by large increases in unemployment but most governments seemed prepared to accept this as a necessary cost of lower inflation. In 1990, the EMS was generally held to have been a success because it had reduced the variability of members' bilateral exchange rates.

The second half of the 1980s also saw a renewed political push towards monetary integration. In 1985, when member countries adopted the Single European Act, they increased the need for the progressive development of economic and monetary union (EMU). In June 1988 the Council of Europe set up a committee under Jacques Delors, the President of the European Commission, to study and make proposals regarding the necessary stages for the achievement of EMU. The result, submitted in April 1989, was *The Report of the Committee on Economic and Monetary Union*, also known as the Delors Report. It set out the goal to be

<sup>2</sup> Only Italy accepted this offer at the beginning, although later Spain (1989), the UK (1990) and Portugal (1992) all accepted the 6 per cent band on joining the ERM.

**Box 22.2 Central parity changes in the ERM**

(All figures are percentage changes in central rates against the Ecu)

*Period One – 1979 to 1983: the early problems*

13 Mar 1979	ERM comes into operation
24 Sep 1979	DM +2; krone -2.9
30 Nov 1979	Krone -4.8
23 Mar 1981	Lira -6
5 Oct 1981	Lira, Fr franc -3; DM, guilder +5.5
22 Feb 1982	Bel/Lux franc -8.5; krone -3
14 June 1982	Fr franc -5.75; lira -2.75; DM, guilder +4.25
21 Mar 1983	Fr franc, lira -2.5; DM +5.5; punt -3.5; Bel/Lux franc +1.5; krone +2.5; guilder +3.5

*Period Two – 1983 to 1987: settling down*

22 Jul 1985	Lira -6; all others +2
7 Apr 1986	Fr franc -3; DM, guilder +3; krone, Bel/Lux franc +1
4 Aug 1986	Punt -8
12 Jan 1987	Bel/Lux franc +2; DM, guilder +3

*Period Three – 1987 to 1992: stability*

1 Jun 1989	Peseta joins ERM
5 Jan 1990	Lira's band narrowed from $\pm 6$ to $\pm 2.25$ , implicitly changing central rate by -3.7
8 Oct 1990	Sterling joins ERM
6 Apr 1992	Escudo joins ERM

*Period Four – 1992 to 1996: renewed disturbance*

14 Sep 1992	Lira -3.5; all others +3.5
16 Sep 1992	Sterling suspended from ERM
17 Sep 1992	Lira suspended from ERM; peseta -5
23 Nov 1992	Peseta, escudo -6
30 Jan 1993	Punt -10
13 May 1993	Peseta -8; escudo -6.5
2 Aug 1993	Bands widened to $\pm 15$
1 Jan 1995	Schilling joins ERM
6 Mar 1995	Peseta -7; escudo -3.5
14 Oct 1996	Markka joins ERM
25 Nov 1996	Lira rejoins ERM

reached, the reasons for it and its possible implications, as well as specifying the desired stages leading up to EMU. The Delors Report was accepted as the basis for the debate at the European summit held in Madrid on 26 June 1989. Its principal recommendations were then incorporated into the Treaty on European Union, agreed upon at Maastricht in December 1991.<sup>3</sup>

## 22.2 The Treaty on European Union and the plans for monetary union

The Treaty on European Union set out the nature, functions and constitution of the new central banking system which would manage the single currency, monetary policy and foreign exchange in monetary union. It also explained how fiscal and budgetary policy would be managed and set out the stages through which EMU would be reached. The first stage was seen retrospectively as having commenced in July

1990 with the liberalization of capital flows and the integration of financial markets under the single market programme. During this first stage, all EU countries were to become full members of the ERM in the narrow band and there was to be an increase in the coordination of national monetary policies.

Stage 2 was to begin in January 1994 with the establishment of the European Monetary Institute (EMI) which would have the task of preparing the way for monetary union. Responsibility for the execution of monetary, exchange rate and fiscal policy would still rest with the member states. However, the EMI would plan monetary policy, monitor the policies of member states, and advise member governments. Changes would only be allowed to central exchange rates in the ERM under exceptional circumstances.

The EMI would be replaced at the beginning of Stage 3 by the European Central Bank (ECB) which, together with the central banks of the member states, would form the European System of Central Banks (ESCB). In Stage 3 exchange rates would be irrevocably

<sup>3</sup> Although it was agreed upon at Maastricht, the Treaty on European Union was not signed until 7 February 1992 and did not come into force until 1 November 1993, following slowness in ratification of the Treaty by many countries.

fixed and national currencies would eventually be replaced by a single currency. The ECB would take over from the EMI, and would assume responsibility for exchange rate and monetary policies. A decision was required before the end of December 1996 as to when Stage 3 would commence. If, however, no date had been set by the end of 1997, the third stage would start on 1 January 1999.

With regard to membership of the monetary union, the Treaty set out a number of **convergence** conditions, which EU member states would need to meet to be allowed to join. Membership would require:

- 1 demonstration that the country's inflation rate had converged on the lowest rates of inflation within the union – to be judged specifically by whether the average rate of inflation, observed over a period of one year before the decision regarding membership was within 1.5 percentage points of the average of the three lowest national rates;
- 2 evidence that the inflation convergence was durable – to be shown by a long-term interest rate within 2 percentage points of the average of the long-term interest rate of the three countries with lowest inflation;
- 3 a sustainable **government financial position** defined as (i) a general government budget deficit no greater than 3 per cent of GDP at market prices and (ii) a ratio of gross public debt to GDP at market prices no greater than 60 per cent – unless this debt ratio is falling 'at a satisfactory pace';
- 4 observance of the normal fluctuation margins provided for by the ERM of the EMS for at least two years with no devaluations against any other member currency.

A majority of the EU member states were required to be economically fit for monetary union if the currency union were to go ahead from December 1996 but it would be established on 1 January 1999 (with membership being determined by July 1998) no matter how few member states were eligible.

The specific numbers included in the convergence conditions had nothing in particular to recommend them. At the time of the signing of the Treaty on European Union, they looked to be achievable targets for many EU member states while appearing sufficiently tough to hope to persuade financial markets that the monetary policies pursued after 1999 would be strong, anti-inflationary policies.

### 22.3 The problems of the 1990s

At the beginning of 1992, everything seemed to be going well for the EMS and hopes were high of meeting the deadlines of the Treaty on European Union for the formation of EMU by 1997 or by 1999 at the latest. Yet by September of that same year, two major currencies (sterling and the lira) had been forced out of the ERM while three others (the peseta, the escudo and the punt) had devalued. Three more currencies (the French franc, the Danish krone and the Belgian franc) remained under severe pressure at various stages in the following months and in August 1993 the allowable band around central rates within which countries were required to keep their exchange rates was widened to  $\pm 15$  per cent in order to preserve the central rate of the French franc and to make life more difficult for speculators.

What had gone wrong? Both economic and political factors contributed to the crisis. Part of the problem was that by 1992 exchange rates were well out of line following the prolonged period without adjustment of central rates. Although inflation rates had converged to a considerable extent, the differences that remained had meant that a number of countries had become seriously uncompetitive at the existing exchange rates.

The economic problem of misaligned exchange rates was added to by popular concerns regarding the increased speed of integration of the EU. In Britain's case this was nothing new. The British government's doubts had been expressed at the Maastricht conference by its insistence that Britain be given the right to opt out of membership of the single currency. In other member states, uncertainty about the future had clearly increased and this was shown by the narrowness with which the referendum held in France to approve the Treaty on European Union was passed and the loss of the first referendum held in Denmark on the same question. The increase in doubt about the future of the EU expressed itself in foreign exchange markets through a weakening of currencies already weakened by worries about competitiveness.

The final element was the increased freedom that speculators had to exploit the difficulties of weak currencies because of the capital liberalization that had occurred under the Single European Act. Speculators knew that if they sold weak currencies in large quantities for sufficient periods of time, currencies were

very likely to be forced either to devalue or to leave the ERM. In the second case, once weak currencies floated outside the ERM they would be very likely to fall sharply. In either event, speculators would be able to buy the weak currencies back at much lower rates than they had sold them for, thus making large per annum rates of profit. Because central banks could no longer impose capital controls and because the capital movements were so very large, central banks were in no position to resist the downward pressure on weak currencies. Where they tried and failed, as with the Bank of England, they experienced very large losses.

There were two apparent solutions. The first was that interest rates should be generally lowered across the EU to help countries in recession. This would have required the *Bundesbank* to lower its interest rate. This it was unwilling to do for two reasons – one local and one related to the aims of the EMS as a whole. The local, if very large, problem that Germany faced was the absorption by West Germany of the very weak East German economy following German unification in 1989. The German government had, for internal economic and political reasons, exchanged Deutschmark for the East German currency, the Ostmark, at equal value. This had increased the total German money supply much more than total German production had increased as a result of unification and raised fears of increasing inflation. These fears were augmented by the promise of the government not to increase taxation rates during the unification process. Public expenditure and budget deficits inevitably increased.

The *Bundesbank's* natural response was to raise interest rates, rather than to lower them as the UK wanted. This made sense in terms of the system as a whole, if one accepted that a major advantage of the EMS was that it allowed inflation-prone countries to lower their rates of inflation by linking their currencies to that of low-inflation Germany. This possibility would have disappeared had inflation rates in Germany climbed sharply.

The solution from the German perspective was then for the weak currency countries to accept a realignment within the EMS. The devaluation of those currencies would, however, have increased inflationary pressures and caused doubts to arise about their future

determination to fight inflation. The UK, in particular, was unwilling to countenance an organized, ordered devaluation. The increase in tensions between the *Bundesbank* and the British government caused further doubts in the foreign exchange market and led to more downward pressure being exerted on sterling. Italy was also thought to be uncompetitive at the existing central rates and speculators spread their attack to the lira. Spain and Portugal were able to contain the pressure to some extent both because they were still in the 6 per cent band of the EMS and because they were able to reintroduce controls over the flow of capital.<sup>4</sup>

This period of exchange rate turmoil marked the beginning of a long period of doubt about both the prospects of monetary union occurring in 1999 and the countries likely to qualify to join at its beginning. Doubts were intensified as it became clear that most EU members would have grave difficulty in meeting the convergence conditions laid down at Maastricht. The principal difficulty related to the requirement of a sustainable government financial position. European economies experienced deep recessions in the early 1990s and this inevitably led to budget deficits in most countries well beyond the limit of 3 per cent of GDP.

In addition to the problems over government finances, the exchange rate disturbances of 1992 and 1993 had made the achievement of the fourth convergence condition very difficult. To begin with, by March 1997, the UK had not rejoined the ERM and Greece and Sweden were still to become members. The narrow band had all but been destroyed and, with bands of  $\pm 15$  per cent, the phrase 'observance of the normal fluctuation margins provided for by the ERM' had very little meaning. The exchange rate changes had also interfered with the convergence of inflation rates.

## 22.4 The movement to monetary union

By 1997 doubts about monetary union had risen to the extent that postponement of the 1999 starting date seemed increasingly likely. At that stage few countries seemed likely to meet all the convergence criteria by July 1998.

<sup>4</sup> Spain and Portugal had both been given until the end of 1992 to remove all capital controls under the SEA.



The governments of France and Germany remained strongly committed to the single currency on political grounds but faced increasing doubts from their own populations. France had unemployment of over 12 per cent and had experienced both social and industrial unrest. There was a strong feeling that the high unemployment was at least partly the result of the policy of maintaining the value of the franc in terms of the German mark in order to keep alive hopes of the single currency. This had required constant downward pressure on government expenditure but yet more cuts in expenditure would be needed to push government borrowing below 3 per cent of GDP. Meanwhile, Germany had high unemployment also, although this could still be seen to a significant extent as one of the costs of unification. Of more concern to the German supporters of monetary union were the widespread fears that the replacement of the Deutschmark by the single currency would mean higher inflation.

In the event, the political problems were overcome and the strong drive to meet the conditions together with some generous accounting interpretations of the facts allowed the European Council to argue that almost all of the countries that had wished to be part of the first wave of membership of the union had either met the conditions or were moving towards them with sufficient speed. This was most dubious in relation to Italy whose public debt remained stubbornly well above the desired 60 per cent of GDP. However, Italy had been a founding member of the EU in 1957 and had always been a strong supporter of integration. Further, it was a large country and, from a trading point of view, it was better to have it as a member of the single currency than not.

Consequently, of the 12 countries that wished to join from January 1999, only Greece failed on the convergence criteria and the single currency commenced with 11 participating members. Three members of the EU – the UK, Denmark and Sweden – chose to remain outside of the monetary union at least for the time being. Greece was judged to have done sufficiently well in relation to the convergence criteria within the following two years and became a member of the single currency from 1 January 2001. Table 22.1 shows the exchange rates used for the conversion of the founding 11 currencies to the euro at the beginning of 1999 and the conversion rate for the drachma at the beginning of 2001.

**Table 22.1** Conversion rates of single currency countries to the euro<sup>1</sup>

Country	Old Currency	Conversion Rate
Austria	Schilling (Sch)	€1 = Sch13.7603
Belgium	Franc (BFr)	€1 = BFr40.3399
Germany	Deutschmark (DM)	€1 = DM1.95583
Spain	Peseta (Pta)	€1 = Pta166.386
Finland	Markka (FM)	€1 = FM5.94573
France	Franc (FFr)	€1 = FFR6.55957
Ireland	Punt (I£)	€1 = I£0.787564
Italy	Lira (L)	€1 = L1936.27
Luxembourg	Franc (LFr)	€1 = LFr40.3399
Netherlands	Guilder (Fl)	€1 = Fl2.20371
Portugal	Escudo (Es)	€1 = Es200.482
Greece	Drachma (Dr)	€1 = Dr340.75

<sup>1</sup> From 1/1/99 with the exception of the Drachma, which joined the single currency on 1/1/2001.

## 22.5 Monetary union developments

After agreement was reached regarding the number of members of monetary union, progress towards the full establishment of the monetary union commenced. The European Central Bank (ECB) and the European System of Central Banks (ESCB) were established on 1 June 1998 and in September agreement was reached with Denmark and Greece, two of the countries not in the first wave of single currency membership, over the formation of a replacement for the old ERM (ERM II). Under this agreement, Denmark agreed to keep its currency within a band of 2<sup>1</sup>/<sub>4</sub> per cent around its central rate with the euro. Greece, on the other hand, stuck with the existing 15 per cent band. Sweden and the UK chose not to be a part of ERM II, which meant that their currencies would float against the euro when it was established. During the second half of 1998 important decisions were made by the Governing Council of the ECB regarding post-monetary union monetary policy. These are included in the list of important monetary union dates in Box 22.3 and are discussed in Chapter 23.

The euro was formally established on 1 January 1999 and trading in the currency commenced on 4 January. Although the euro was a fully established currency from that date, euro notes and coins were not issued until

**Box 22.3 Monetary union developments 1998–2004**

1 Jun 1998	Establishment of ECB and ESCB	1 Sep 2000	ECB raises minimum refinancing rate from 4.25 to 4.5%
26 Sep 1998	Denmark and Greece agree to participate in ERM II	22 Sep 2000	ECB is joined by the US, UK and Japanese central banks in intervention in the currency markets to support the weakening euro
13 Oct 1998	ECB announces a target inflation rate for the euro area of less than 2%	28 Sep 2000	Danish referendum decides against membership of the euro area
1 Dec 1998	ECB announces a reference value for monetary growth (M3) of 4.5%	6 Oct 2000	ECB raises minimum refinancing rate 25 basis points to 4.75%
22 Dec 1998	ECB sets its main refinancing interest rate at 3%	25 Oct 2000	The euro falls to US\$0.8250
31 Dec 1998	Conversion rates of the 11 participating currencies into the euro established from 1 Jan 1999	10 May 2001	ECB cuts minimum refinancing rate 25 basis points to 4.5%
4 Jan 1999	Trading begins in euros and ERM II commences operation	31 Aug 2001	ECB cuts minimum refinancing rate 25 basis points to 4.25%
9 Apr 1999	ECB cuts refinancing interest rate from 3% to 2.5%	18 Sep 2001	ECB cuts minimum refinancing rate 25 basis points to 3.75%
5 Nov 1999	ECB raises refinancing interest rate 50 basis points to 3%	9 Nov 2001	ECB cuts minimum refinancing rate 25 basis points to 3.25%
3 Dec 1999	Euro falls below parity with the US dollar for the first time	1 Jan 2002	Introduction of euro notes and coin
4 Feb 2000	ECB raises refinancing interest rate by 25 basis points to 3.25%	7 Nov 2002	Euro rises above parity with the US dollar
17 Mar 2000	ECB raises refinancing rate 25 basis points to 3.5%	6 Dec 2002	ECB cuts minimum refinancing rate 50 basis points to 2.75%
28 Apr 2000	ECB raises refinancing rate 25 basis points to 3.75%	17 Mar 2003	ECB cuts minimum refinancing rate 25 basis points to 2.5%
9 Jun 2000	ECB raises refinancing rate 50 basis points to 4.25%	6 Jun 2003	ECB cuts minimum refinancing rate 50 basis points to 2.0%
19 Jun 2000	Greece granted membership of the single currency from 1 Jan 2001	18 Nov 2003	Euro rises above its value on 4 Jan 1999, reaching €1 = 1.18957
28 Jun 2000	ECB changes refinancing operations from fixed to variable interest rate system	9 Jan 2004	Euro reaches a new high of €1 = \$1.28514

1 January 2002. Before that date, national currencies remained in use throughout the euro area.

In many ways the euro was a success. However, the attention of economic and political commentators was directed almost entirely to the weakness of the euro against other currencies, particularly the US dollar. A confident opening for the euro saw it reach an exchange rate of €1 = \$1.18738 at the end of the first day of trading. However, the euro's value began to fall immediately after this and, despite occasional small recoveries, it fell steadily to a low of \$0.8250 during trading on 25 October 2000, a loss of value of over 30 per cent. Although it then began to rise again and went above \$0.95 in early January 2001, it could not sustain the recovery and fell back below \$0.90

in mid-March 2001. It hovered around \$0.90 until late 2002, when it was able for the first time in three years to maintain a rate above parity in relation to the dollar. In 2003 the value of the euro increased steadily, going above \$1.25 by the year's end. The weakness of the euro was no longer an issue. The exchange rate performance of the euro is discussed in Chapter 23, along with the monetary policy followed by the ECB.

In what ways, then, could the euro be considered a success? Four arguments are usually put forward. Three of these are microeconomic. The first relates to the lowering of transaction costs and increased **price transparency** across the national borders in the euro area. The single currency makes it much more difficult

for producers to charge different prices in different markets. This should allow efficient firms to compete more effectively, which should help to increase the rate of economic growth.

The second point in favour of the euro is the assurance it has brought of exchange rate stability for exporters, importers and investors active throughout the euro area. It allows them to avoid the costs involved in covering exchange rate risk relating to exposures vis-à-vis the countries in the euro area. The lower costs brought about by the single currency reduce the barriers to cross-border trade and investment and should encourage small and medium-sized companies that have, in the past, been active only in the domestic market to enter the markets of the neighbouring countries, further increasing the degree of competition within the euro area.

Thirdly, the use of a single currency has had an important impact on the development of European financial markets. From January 1999, the euro established itself as one of the world's leading trade and investment currencies, in particular as a currency for international bond issuance. In April 2000, Otmar Issing, the chief economist of the ECB announced that the value of bonds issued in euro had surpassed that of US dollar bonds. The development of a deep and liquid bond market in euro makes it easier for companies to raise finance, even for the riskier projects, in the domestic capital market, without incurring exchange rate risks. Again, it has been argued that the introduction of the euro and the development of the corporate bond market that has followed has provided support for merger and acquisition activity by euro area firms as well as improved efficiency and competitiveness. Equally, the introduction of the single currency has boosted integration efforts in equities and derivatives markets and payment and settlement systems.

The final argument in support of the euro concerns the impact of the economic policies that were necessary to allow countries to meet, or nearly meet, the Maastricht convergence conditions for monetary union membership together with the stability and growth pact, which is meant to govern national fiscal policies within monetary union. It has been suggested that the resulting greater stability in macroeconomic policy has been beneficial to firms and has encouraged member countries to carry out important restructuring of economies, notably of labour markets and tax systems.

## 22.6 Future membership of the monetary union

There are currently 13 EU member states that are not members of the **euro area** – Denmark, the UK, Sweden and the 10 countries that became members of the enlarged monetary union on 1 May 2004. In the Maastricht Treaty negotiations, Denmark and the UK were granted derogations from participating in the monetary union until such time as the countries themselves requested membership. Denmark has since confirmed the decision to remain outside the single currency in two referendums, the second being on 28 September 2000. Since the margin in favour of remaining outside the euro area was quite high in this referendum (53.1 to 46.9 per cent), it seems unlikely that the question will again be put to the Danish people in the near future.

The UK government indicated in 1998 its willingness in principle to join the single currency but added that it would only do so when the economic case for membership was 'clear and unambiguous'. In June 2003, the UK Treasury confirmed its view that the economic conditions it had set for membership had not yet been attained. If, and when, the decision is taken in the future that UK membership can be fully justified in economic terms, the question will be put to a referendum. The details of the UK Treasury's enquiry into UK membership of the euro area is considered in detail below.

The other EU countries, including Sweden, are assessed regularly to ascertain whether they fulfil the criteria for introducing the euro as their currency. In recent assessments of Swedish eligibility, the krona's exchange rate with the euro was judged insufficiently stable. In any case, the Swedish Parliament decided in 1997 that Sweden would not participate in the monetary union from its inception in 1999. This decision was confirmed in a referendum on the euro in September 2003. Sweden will thus remain outside the monetary union for the foreseeable future.

The 10 new member countries are committed to adopting the euro but this is unlikely to happen for some time. They must first meet the convergence criteria including two years of exchange rate stability. In addition, they are able to decide themselves when they think their economies are ready for them to be able to live with the single currency. There is no fixed timetable for their membership.

## The UK and membership of the euro area

Technically, the UK was not eligible to join the euro area at the beginning of January 1999 because sterling had not been a member of the exchange rate mechanism (ERM) of the EMS for at least two years immediately prior to the establishment of the monetary union (sterling had been in the ERM only from 1990 to 1992). In practice, sterling would almost certainly have been granted membership from January 1999, but the government chose to exercise its opt-out and remain outside. The question was then whether the UK would join in the future and, if so, when. The factors to be taken into account in making the decision to join or not were expressed in the **five economic tests** set out by the Chancellor of the Exchequer, Gordon Brown, in July 1997.

The five economic tests were:

- 1 *Are business cycles and economic structures compatible so that we and others could live comfortably with euro interest rates on a permanent basis?*

There are three separate issues here:

- whether external shocks are likely to affect the UK economy in the same way as they do the other EU countries;
- whether the timing of business cycles in the UK is similar to that in the rest of Europe – if not, the UK economy might require interest rate cuts when other euro area countries require interest rate increases or vice versa;
- whether the UK economy is sufficiently different from the rest of the EU in other ways – in production, tax, financial and wage setting systems and in institutional structures – that a change in a common European monetary policy might have a significantly different impact on the UK economy from that experienced by other members.

In October 1997, HM Treasury published an assessment of the five tests, which stressed the crucial nature of business cycle convergence and argued that, at that time, the timing of the UK business cycle remained significantly different from that of the rest of the EU and that forward-looking measures indicated that significant differences would remain into 1999 and beyond. In the Treasury's second evaluation of the tests, in June 2003, it concluded that significant progress had been made on convergence since 1997 and that

UK business cycles were now more convergent with the euro area generally than was the case for some other euro area members. However, concern over structural differences, notably in the housing market, led to the view that, on balance, the test was still not being met. Since convergence is a continuing process, there is likely to be some date in the future when the Treasury will judge that the UK economy is sufficiently integrated with the rest of the euro area to be able to live comfortably with euro interest rates. However, there is a strong element of judgement here and different people view the matter in different ways. It is also possible that membership of the single currency would speed up the process of integration. Further, it is possible that the problem with a single monetary policy for Europe is as much a regional as a national one – that is, if the UK were a member of the single currency area, a particular interest rate decision might suit, say, the regions centred on Paris, Hamburg, Madrid and London but cause unhappiness in the south of Germany, northeast France, the Basque country of Spain and Scotland. In the debate about UK compatibility with the rest of the euro area, there is probably a tendency to overstate the extent to which all parts of the UK economy are similar. Nonetheless, it is true that interest rate changes can have significantly different impacts on national economies.

- 2 *If problems emerge is there sufficient flexibility to deal with them?*

This principally concerns the flexibility of the labour market and the ability of the UK economy to withstand economic shocks, including those induced by inappropriate monetary policy decisions, given that the shock could no longer be mitigated by the adjustment of the exchange rate between sterling and the euro. The role of labour market flexibility is not free from controversy. There are two concerns. The first is with the ability of the euro area as a whole to recover from negative economic shocks because of labour market inflexibility arising from government regulations regarding wages, working hours, employer rights to fire workers and, in general, the 'freedom of management to manage'. The EU's concern with social policy and workers' rights is often pointed to as a basic reason for slow EU growth in comparison with growth rates in the USA. The second issue is the lack of labour market mobility across the euro area. It is normally argued that the much greater degree of labour mobility in national economies such as the

USA provides a safety valve for regional pressures as labour moves from high to low unemployment areas, helping to balance the unequal impact of asymmetric shocks or policies. Labour mobility might be hampered again by labour market regulation as well as by other aspects of social policy and regulations governing the housing market and pensions. It is not clear that the weakening of employment and social policy would have much effect on euro area labour mobility, given the continuing language and cultural differences and lack of information regarding employment opportunities and living conditions across national boundaries. It is also not clear whether greater labour market mobility always has a positive impact.

The Treasury 2003 evaluation concentrates on UK labour market flexibility, arguing that the slower is the progress on flexibility within the EU, the more important it is to have a high level of labour market flexibility in the UK. It concludes that, although labour market flexibility has increased considerably in the UK since 1997, it is not certain that it has improved sufficiently. Again, this is a matter of judgement.

### 3 *Would joining EMU create better conditions for firms making long-term decisions to invest in Britain?*

It is difficult to say much about this in advance. Euro interest rates are lower than those in the UK, in part because of the continued presence of an exchange rate risk premium on sterling. It is likely, therefore, that entry into the euro would reduce the cost of capital for UK firms. Small and medium-sized enterprises might also benefit from greater financial integration consequent on membership of the euro area. It is further possible that foreign direct investment (FDI) in the euro area will increase with the single currency and that the UK's share of this might fall were it to remain outside for a prolonged period. Indeed, the UK's share of FDI flows into the EU did fall between 1999 and 2003. However, investment decisions of firms are influenced by many factors and we cannot definitely know what would have happened to incoming investment had sterling joined the euro area in 1999. For example, during the period 1999–2002, the UK economy performed well in relation to most of the euro area economies and this must have helped to persuade firms to stay in or come to the UK. A period of weakness in the UK economy or a period of sharp growth in, say, France and Germany could easily produce a greater fall in the UK's share of FDI flows irrespective of whether the UK joins the euro area.

Were the UK to join, the question would remain counterfactual since we should not know what would have happened had the UK not joined. We have a certain amount of anecdotal evidence. Several large firms have made it clear that they would prefer the UK to be in the euro area and might possibly relocate from the UK into the euro area if the UK remains outside the single currency for much longer. There have also been some investment decisions in favour of the euro area against the UK that have been said to relate largely to the UK's being outside the area. However, it is hard to judge these statements and actions. Some of the unhappiness on the part of foreign firms with the UK's failure to join the single currency in 1999 has stemmed from the strength of sterling against the euro. Nonetheless, the Treasury evaluation concluded that the quantity and quality of investment in the UK would very likely increase with euro area membership. The Treasury, however, hedges its bets by making this judgement dependent on the assumption that sustainable and durable convergence had been achieved before membership. Thus, the third test becomes subject to the first one, which then assumes greater importance.

### 4 *What impact would entry into EMU have on the competitive position of the UK's financial services industry, particularly the City's wholesale markets?*

There is no obvious reason why the City of London should benefit from the UK remaining outside the single currency. Thus, the question appears to be whether continued failure to join might cause the City to lose business to Paris or Frankfurt. There is no evidence that this has occurred since January 1999 and it seems likely that the City of London would remain strong in wholesale financial markets whether the UK joined the euro or not. Nonetheless there are probable additional benefits for the financial services industry from membership of the euro area as European financial markets become increasingly integrated through the EU's Financial Services Action Plan. The Treasury, therefore, concluded that this test had been met. Yet it remains difficult to quantify the potential gains here in order to weigh them against other possible losses.

### 5 *In summary, will joining EMU promote higher growth, stability and a lasting increase in jobs?*

The Treasury 2003 evaluation notes the increase in intra-euro area trade in recent years and attributes this to the single currency. It concludes, on this basis, that

membership of the single currency could lead to a significant increase in UK trade within the euro area and that this, in turn, could lead to a small but sustained increase in potential output. This suggests that membership could help promote higher growth and a lasting increase in jobs. However, this potential growth is outweighed in the Treasury view by the concerns over macroeconomic stability, in particular that it would be harder to maintain stability within the euro area than outside it. Two particular worries are expressed.

The first of these relates to the monetary policy of the European Central Bank (ECB). It has not been clear from the early years of operation of the ECB precisely what its aim is in relation to inflation. The ECB is charged with maintaining price stability but this is not defined in the Treaty on European Union. The ECB has quantified price stability as an inflation rate between 0 and 2 per cent. However, experience suggests that it has been happy with rates between 1 and 3 per cent. Uncertainty over objectives and more general concerns about lack of transparency in ECB monetary policy has translated into worries that monetary policy may be inconsistent and difficult to anticipate. We deal with this issue in detail in Section 23.6.

The second problem arises from the EU's attempt to constrain the fiscal policy freedom of euro area member countries by the application of the **Stability and Growth Pact**. Article 103 of the Treaty on European Union specifies that where the European Council finds economic policies of a member state that endanger the proper functioning of economic and monetary union, it may make policy recommendations to that member's government and may publish them. In all areas other than that of fiscal deficits, members need not accept these recommendations. Article 104c forbids member states from having excessive budget deficits and charges the European Commission with the task of monitoring the budgetary situation and the stock of government debt of member states. The Commission may report to the Council that an excessive deficit exists. The Council may then make policy recommendations that the member state in question *is obliged to follow*. Failure to do so may ultimately lead to the imposition of financial sanctions in the form of a non-interest-bearing deposit or a fine.

Detail was added to this clause by the agreement of the Stability and Growth Pact of 1997, which set out rules for government borrowing of euro area members after January 1999. These rules converted the 3 per cent of GDP limit on budget deficits in the Maastricht

convergence conditions into a permanent ceiling that might only be breached under exceptional circumstances. These were defined as a natural disaster or a fall in GDP of at least 2 per cent over a year. This would only occur in a severe recession. In cases where GDP has fallen between 0.75 per cent and 2 per cent in a single year, EU finance ministers have discretion over whether to impose penalties. Members who break the 3 per cent barrier in other circumstances are required to make heavy non-interest bearing deposits with the European Central Bank. These deposits would be converted into fines should the member's budget deficit remain above the 3 per cent limit. Since there is discretion in the application of fines, it is still unclear to what extent the Stability and Growth Pact will ultimately be enforced. Member countries have been warned and threatened with action but nothing more has yet occurred. Nonetheless, the threat remains.

From a macroeconomic stabilization point of view, the firm application of the Pact would make little sense since the fines would make it more difficult for governments to get their borrowing back below 3 per cent of GDP and would very likely require a higher level of unemployment to achieve it. The restriction of fiscal policy in this way would thus remove another element of flexibility in the management of national economies and would increase the costs associated with the loss of freedom to change exchange rates. The UK would like two changes to the interpretation of the pact.

Firstly, it does not see a problem with public sector deficits produced by increases in government investment since successful investment should contribute to future economic growth and permit the repayment of government debt without forcing interest rates up. It would also allow the UK government to continue its current heavy investment programmes in health and education to overcome underinvestment in these areas over many years. Allowing this freedom to break the 3 per cent deficit limit would be in accord with Gordon Brown's 'golden rule' of public finance – that over the economic cycle, the government should borrow only to invest and not to fund current spending. Secondly, the UK argues that governments that do not have a high public debt/GDP ratio should be allowed greater freedom in fiscal policy than those countries that do. That is, the rules should be applied strictly only to member countries with a debt problem. The Treasury concluded in 2003 that if the macroeconomic framework were to change in the direction favoured by the UK, the fifth test would also be passed.

There has been little indication that these views will be accepted but the operation of the Stability and Growth Pact was effectively suspended in late 2003 when it became clear that France and Germany were unwilling to take the actions needed to return their budget deficits below the required 3 per cent of GDP. Little seemed likely to happen until agreement was reached on a new constitution for the EU following the enlargement of May 2004.

We thus have some tests passed and some not. As one would expect, joining a single currency area at any time would carry with it some economic advantages and some disadvantages. However, the Treasury plainly does not see the exercise as one of weighing these up. One of the five tests – the first, relating to economic convergence – turns out to be more important than the others. We have seen that the Treasury's view that the UK currently fails this test was one of judgement, rather than of clear-cut fact. It follows that there is little possibility that at any time in the future membership will be 'clearly and unambiguously' to the UK's economic advantage. This is hardly surprising since little economic analysis of future events produces 'clear and unambiguous' support for anything.

The problem, then, with the five economic tests is that they are sufficiently open to interpretation that the decision when to hold a referendum on membership remains much more likely to be decided by political factors. There is nothing, of course, inherently wrong with this since there can be little doubt that the single currency is to a significant extent a political project and political advantages of greater European integration should not be left out of the equation.

## 22.7 Summary

There have always been strong political and economic motives behind the desire to move to monetary union. The need for closer monetary integration only became urgent, however, with the breakdown of the fixed exchange rate Bretton Woods system from the late 1960s on. Plans to move to a single currency by 1980 came to nothing and the fixed exchange rate system established in 1972, the Snake, failed. The European

Monetary System (EMS) was established in 1979 to attempt to limit exchange rate uncertainty within the EU. After some difficult years, the system appeared to be settling down. This, together with the passing of the Single European Act in 1986, encouraged hopes for a renewed attempt to move to monetary union. The Delors Report recommended a three-stage process for achieving economic and monetary union and this was confirmed at the Maastricht conference in December 1991, with 1 January 1999 being set as the latest date by which monetary union must occur.

Optimism about monetary union was badly dented by the major currency disturbances of 1992 and 1993 which led to sterling and the lira being suspended from membership of the exchange rate mechanism of the EMS and to the bands within which currencies were allowed to move within the mechanism being dramatically widened. Despite this, a strong determination to achieve monetary union remained on the part of the European Commission and of several governments. As the starting date became closer, however, doubts arose about the ability of many governments, most importantly those of Germany and France, to meet the conditions for the single currency membership laid down at Maastricht. In the event, 11 countries were allowed to join the single currency, the euro, which was established on schedule at the beginning of January 1999. Greece became the twelfth member at the beginning of 2001.

Most discussion of the performance of the euro during its early years was concentrated on the falling value of the euro, especially against the US dollar. In other ways, however, the establishment of the euro could be argued to have been a success, especially to the extent that its existence would help the EU to reap more fully the benefits of the Single European Market. Doubts about future membership of the single currency remained in 2004. Denmark and Sweden chose in referendums not to join. The UK government was in favour of membership in principle but had committed itself to a referendum to be held only after five economic tests laid down by the Treasury could be judged to have been met. It was unlikely that the ten new members of the EU would be ready for membership of the monetary union for some time.

### Key concepts in this chapter

Exchange Rate Mechanism (ERM)  
Snake in the Tunnel  
Convergence  
Monetary Union  
Parity grid  
Central rates  
Government financial position

Anti-inflationary credibility  
Economic and monetary integration  
Price transparency  
Euro area  
Stability and Growth Pact  
Five economic tests

### Questions and problems

- 1 Explain the reasoning behind each of the Maastricht convergence conditions.
- 2 What were the *economic reasons* for wanting monetary integration in Europe?
- 3 Consider the argument that monetary union was a necessary extension of the European single market.
- 4 Why was it important that Germany should be a member of the European single currency?
- 5 Why did Denmark, Sweden and the UK choose to stay outside the single currency when it was established? Were the reasons the same in each case?
- 6 Consider the difficulties in coming to a conclusion on each of the UK Treasury's five economic tests for membership of the single currency.
- 7 What are the advantages of having a weakening currency?

### Further reading

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#### Websites

[www.econ.yale.edu/~Corsetti](http://www.econ.yale.edu/~Corsetti)

[www.ecb.int/home](http://www.ecb.int/home)

[www.hm-treasury.gov.uk](http://www.hm-treasury.gov.uk)



## Chapter 23

# The European Central Bank and euro area monetary policy

### *What you will learn in this chapter:*

- The possible forms of determining monetary policy in a monetary union
- The arguments for and against central bank independence
- The reasons for concern about the size of the budget deficits of EMU members
- The Maastricht Treaty rules regarding the European Central Bank and its policy
- The nature of the questions to be resolved concerning post-EMU monetary policy

## 23.1 Introduction

In a **currency area** with completely fixed exchange rates *and* full freedom of capital flows, there must be a **common monetary policy**. Imagine that each member of such an area tried to operate its own monetary policy. Suppose that one member decided to have a tighter monetary policy than the rest. As soon as it raised interest rates, capital would flow into the country from other member states. This must happen since, with completely fixed exchange rates, there would be no foreign exchange risk and so no distinction between covered and uncovered interest parity. Capital would move until interest rates were again the same in all member states. Exactly where the common interest rate finished up would depend on the monetary policies and relative strengths of the member states, but there would be only one interest rate for the area as a whole.

But how should the common monetary policy be determined? There are two possible models:

- 1 the *asymmetric leadership model*: one country's monetary policy dominates those of other members and effectively becomes the monetary policy for the entire area;
- 2 the *joint-decision model*: governments or central banks of member countries meet together and decide upon the common monetary policy through discussion and compromise.

This leaves us to ask who becomes the leader in the asymmetric leadership model. Again there are two possibilities:

- 1 that the system is organized around one currency which thus necessarily becomes the leader – this was the case with the US dollar in the Bretton Woods fixed exchange rate system;
- 2 that a currency becomes the leader because the market and other governments feel that it is most likely to retain its value – this is likely to be the currency which is thought likely to have, over a run of years, the lowest average rate of inflation since, within a fixed exchange rate system, higher rates of inflation will quickly make a country's goods uncompetitive in international markets.

If exchange rates are not fully fixed and/or if there are effective controls on the flow of capital, member

countries may be able to determine their own monetary policies to a considerable extent. We have seen that, apart from the five years between 1987 and 1992, the EMS was not a fully fixed exchange rate system. Even between 1987 and 1992, the possibility of changes in central rates was sufficiently powerful that there was very little change over the period in foreign exchange risk premiums. Equally, up until 1990, many members still had capital controls in place. Thus members had some freedom over their own monetary policies. Nonetheless, it is generally accepted that the Deutschmark was the leading currency within the system and that German monetary policy had a quite strong influence on the policies of other countries. Why was this so?

Firstly, Germany had, over a long period, built up a reputation as a low-inflation country. It was also the biggest and most powerful economy in the system. Secondly, it was believed that its institutional arrangements were such that it would go on delivering low inflation into the future. That is, its monetary policy was run by its central bank, the *Bundesbank*, which was constitutionally independent of the democratic political process. Further, the control of inflation was the major, although not the only, objective set down in the *Bundesbank's* constitution.

The importance given to this institutional arrangement was seen in the period immediately after German unification. The way in which the West and East German monetary systems were unified, combined with the unwillingness of the German government to raise tax rates to pay for the inevitable increase in government expenditure following unification, led to a temporary increase in inflation above the levels normally associated with Germany. Given the severe difficulties faced by the inefficient industry of the old East Germany, there would have been a strong temptation for any government in control of monetary policy to run an easy, low interest rate policy to encourage investment and expansion. The financial markets were confident, however, that the *Bundesbank* would not follow such a policy. Thus, although French inflation was lower than German inflation for some time, there was no great switch of funds from DMs to French francs. The markets held to the view that the DM was still the more trustworthy currency in the medium to long term.

The general argument about the relationship between the independence of central banks and the rate of inflation is summarized in Box 23.1.

**Box 23.1 The independence of central banks and the rate of inflation**

In recent years, it has been widely argued that there is a close association between the degree of independence of central banks and low rates of inflation. The argument depends on a number of contentious theoretical and empirical points.

**FOR**

- 1 Democratic political systems are inflationary and do not take the long-run costs of expansionary policies fully into account because:
  - (a) politicians aim to maximize votes;
  - (b) voters believe that expansionary policy reduces unemployment;
  - (c) there is no long-run trade-off between inflation and unemployment.
- 2 Independent central bankers can precommit themselves credibly to a low-inflation policy rule in the way that governments cannot because:
  - (a) central bankers do not face re-election;
  - (b) it is known that governments benefit from inflation through seigniorage – the gains which accrue to the issuer of a currency because it obtains real resources in return for non-interest-bearing, non-repayable debt.
- 3 Empirical evidence appears to show a relationship between the degree of central bank independence and low rates of inflation.

**AGAINST**

- 1 The apparent empirical relationship is suspect because it depends on a subjective assessment of the degree of independence of central banks.
- 2 Even if there is a statistical relationship, this does not prove causality. Other factors may be responsible for low inflation. Thus, low German inflation may have been due to:
  - (a) the system of universal banking which is lending-based rather than securities-based;
  - (b) the separation of prudential supervision of the banking system from monetary policy;
  - (c) the federal system of government;
  - (d) Germany's historical experience of high inflation;
  - (e) the form of organization of labour markets in Germany.
- 3 Removal of the control of monetary policy from the democratic system has income redistribution effects: favouring those who benefit from low inflation, notably the financial sector, at the expense of the rest of the population.
- 4 Central banks cannot effectively control the money supply which is endogenous – independent central banks merely appear to validate deflationary policies.

A full monetary union with a single currency must, *a fortiori*, have a common monetary policy since the possibility, which must continue to exist in any fixed exchange rate system, that exchange rate parities might be changed, is completely removed. The question still remains as to how that monetary policy will be determined. Placing the operation of policy in the hands of a single, supranational central bank such as the **European Central Bank (ECB)**, does not determine what that bank's monetary policy should be. The policy could be decided either by member governments or by central bankers or by a combination of both. For a country such as Germany, used to both low inflation and a politically independent central bank, there was a serious concern here – that the inclusion in the monetary union of countries with a record of high inflation and/or current economic problems would provide incentives to operate a loose monetary policy.

Thus, a monetary policy decided by discussion and compromise would have been weaker and more inflationary than the existing German policy.

One solution was to apply strict entry conditions designed to keep such countries out of the union *and* to introduce rules that would carry those strict conditions through into policy after the formation of the monetary union (the Stability and Growth Pact). However, the case for monetary union was at least as strongly political as economic and it did not make political sense to restrict membership to a small number of countries with a history of low inflation. In any case, in a period of impending national elections, any government, whatever the country's past inflation performance, might be tempted to ease monetary policy. The obvious answer to this was to model the European Central Bank on the *Bundesbank*, making it independent of all member governments and establishing for it a constitution that

stressed the objective of low inflation. This was what was proposed in the Maastricht Treaty.

Before looking at the nature of the European Central Bank, however, we need to consider rather more closely the problems that this structure was meant to counter.

### 23.2 Inflation, exchange rate risk and default risk in monetary union

The concern with inflation had a number of sources. One stemmed from conventional economic theory. The majority of economists had, by the early 1980s, come to accept a model of the economy in which government attempts to expand the economy through monetary and fiscal policy would lead both to higher inflation and, in the long run, to increased unemployment. Low inflation was thus seen as a prerequisite for future economic growth. The evidence for this proposition was weak but the most successful European economy, that of Germany, had had low inflation over a long period. Thus, it was felt that, although there might be high short-run costs in terms of higher unemployment in getting inflation down, these would be outweighed by the long-run benefits of low inflation.

The current economic theory also taught that the most important element in becoming a low-inflation economy was to establish anti-inflation credibility – that is, to convince the markets that the government was serious in its determination to reduce inflation and to keep it low. If a government could do this, it was held, the short-run costs of producing low inflation would be much reduced. One way of trying to achieve this anti-inflation credibility was to link the economy to low-inflation Germany in a fixed exchange rate system dominated by German monetary policy. This explained the significance of the determination expressed in the Maastricht conditions for convergence on a *low* rate of inflation.

At least two other elements entered the picture as seen by Germany. The first was historical. Even in the 1990s, the folk memory of the economic, social and political devastation wrought by the very high German inflation of the early 1920s appeared to be strong. Probably of greater importance, however, was the understandable fear of savers in a low-inflation economy that the real value of their savings would be rapidly eroded by high future inflation. This fear was given apparent

credence by the behaviour of the financial markets which assumed that post-union monetary policy would be weaker than the existing German policy. From the early 1990s, this assumption was built into long-term German interest rates, with the yield curve rising sharply for maturities beyond 1999. Thus, for Germany, the crucial economic issue became the external value of the single currency after 1999.

The Maastricht convergence condition regarding the government financial position was, in part, related to the desire to produce and maintain low inflation since there was concern that heavily indebted governments would have an additional incentive to push for an expansionary common monetary policy, since a low interest rate would reduce the interest burden upon them and a higher inflation rate would reduce the real value of their debt. However, there was an extra question – the possibility of individual governments attempting to act as free riders. The potential difficulty arose because a monetary union does not require a common fiscal policy. Indeed, to have a fully common fiscal policy requires a high degree of political as well as economic integration.

Members of the monetary union would thus be free to set their own budgets and determine their own budget deficits. With monetary policy in the hands of the European Central Bank they would not be able to finance those deficits by borrowing from their own central banks as in the past; but they would still be able to issue and sell their own government securities. In the monetary union, these securities would be denominated in euros. With no foreign exchange risk, heavily indebted countries would be able to sell their debt at a lower interest rate than previously.

Further, the market for euro-denominated bonds would be so large that individual countries in a large monetary union might hope to increase the budget deficit and finance this by selling additional government securities without causing interest rates to rise. A previously existing constraint on fiscal policy would have been removed. But if several countries behaved in this way, the outcome would be a significant increase in the total amount of the government debt of euro area countries on the market, with the consequence that interest rates across the union would be forced up. Governments with tight fiscal policies would have to accept part of the burden of their more freely spending partners in the form of higher interest rates or support an easier monetary policy from the European Central Bank, with the associated risk of higher inflation.

There was yet another issue. Prior to monetary union, the interest rate on a country's government securities reflected default risk as well as foreign exchange risk. Indeed, where governments attempted to remove the element of foreign exchange risk by denominating their debt in a foreign currency, the credit-rating agencies often attached a lower credit rating to the debt, signalling to the market that the interest rate paid on that debt should reflect a higher default risk. Thus, there was a second constraint on government fiscal policy. If they allowed their indebtedness to grow too large, the credit agencies would lower the credit rating of the government and force the government to pay higher interest rates on their debt, making it more likely that total indebtedness would continue to grow. It was possible to construct a model in which a country's total government debt might grow explosively. Governments could, thus, not afford to allow the market's assessment of their default risk to become too high.

But what would happen to default risk after monetary union? It was arguable that prior to union an Italian default on part of its public debt would have very little impact on any other country. On the other hand, the default of a member of a monetary union on debt payments in the single currency might easily have a spillover effect on market confidence in other euro-denominated debt. Hence it was widely assumed that the European Central Bank would not be prepared to allow any of the monetary union members to become, in effect, bankrupt – that it would be bound to step in and bail out the country in trouble with a consequent increase in the money supply and the risk of greater inflation. The impact of a country believing that it was bound to be bailed out would be to remove also the constraint on its spending imposed by default risk. If the markets believed that any member would be bailed out by the European Central Bank, the relevant credit rating for any euro-denominated debt would be the credit rating of the European Central Bank itself.

This would give free-spending governments total freedom to go on spending and it might also lower the credit rating of the European Central Bank, again causing interest rates on all euro-denominated debt to rise. Monetary union would give governments a clear incentive to operate expansionary fiscal policies. Any country that chose not to do so would not obtain the benefits of increased public expenditure but would incur costs as a result of the expansionary policies of

other member governments. This possibility explains the importance attached to the government financial position in the Maastricht convergence conditions and to the Stability and Growth Pact.

### 23.3 Monetary institutions and policy in the single currency area

Monetary policy in the single currency area is conducted by the **European System of Central Banks (ESCB)**, consisting of the European Central Bank (ECB) and the national central banks of the member states. The ESCB is governed by the Governing Council and the Executive Board of the ECB. To ensure the independence of the ESCB from both the European Commission and the governments of the member states, the national central banks, although continuing to be owned by their governments, were also required to become independent of the political process in their own countries.

Article 105(2) of the Treaty on European Union set the ESCB four basic tasks:

- 1 to define and implement monetary policy of the Community;
- 2 to conduct foreign exchange operations;
- 3 to hold and manage the official foreign exchange reserves of the member states; and
- 4 to promote the smooth operation of payments systems.

Article 105(1) of the Treaty established the primary objective of the ESCB as the maintenance of **price stability**. The ESCB was also enjoined, without prejudice to the goal of price stability, to support the EU's

#### More from the web

There is a great deal on European monetary policy on the web, but one of the very best sites is [www.econ.yale.edu/~corsetti/euro/](http://www.econ.yale.edu/~corsetti/euro/), the website of Giancarlo Corsetti of the European University Institute, Fiesole, Italy and of the University of Yale. It provides access to statistics, research papers and news stories relating to the euro and to European monetary policy. It is vast and has links to almost everything you might want.

general economic policies and to act in accordance with the principle of an open market economy with free competition, favouring an efficient allocation of resources. The general economic policies of the EC are stated in Article 2 of the Treaty as being ‘to promote throughout the Community a harmonious and balanced development of economic activities, sustainable and non-inflationary growth respecting the environment, a high degree of convergence of economic performance, a high level of employment and social protection, the raising of the standard of living and quality of life, and economic and social cohesion and solidarity among Member States’. Article 3a further requires that in attempting to achieve all of this, member states and the Community should comply with the guiding principles of stable prices, sound public finances and monetary conditions, and a sustainable balance of payments. This gave the ESCB a set of objectives similar to those of the *Bundesbank*, which was obliged by law to safeguard the currency while supporting the general economic policy of the German Federal Government.

Although pursuit of general economic policy objectives is not meant to prejudice the achievement of price stability, there is clearly scope for interpretation under circumstances in which an apparent conflict exists between tightening monetary policy and one or more of the general objectives. ‘Price stability’, after all, does not necessarily mean the lowest possible level of inflation. Indeed, with a central bank composed of people from a number of countries with different economic conditions and problems, one might expect a range of interpretations of price stability. Nonetheless, control of inflation is clearly intended to be central. Further, the objective of low inflation is statutorily protected since the ESCB’s objectives can only be changed by the unanimous decision of the Council of

Ministers. The European Parliament has no influence on the objectives of monetary policy.

The possibility of the system’s objectives being interpreted in different ways makes the issue of the composition of the ECB extremely important and raises the question of how to ensure the political independence of the decision makers within the system. Box 23.2 sets out a number of factors widely accepted as relevant to the degree of political independence of a central bank.

The ECB does generally very well on these criteria.

The Executive Board of the ECB, which runs the bank, comprises a president, vice-president and four other members appointed by the Heads of State on a recommendation from the European Council after consultation with the European Parliament and the Governing Council of the ESCB. All six members are required to be ‘persons of recognized standing and professional experience in monetary or banking matters’. In other words, they should be representatives from the world of finance, making it very likely that their interpretation of ‘price stability’ will be conservative.

The term of office for Executive Board members is eight years and is non-renewable. Members of the Executive Board may be compulsorily retired but only for ‘misconduct’, which is defined to include the taking of instructions from a member government. Compulsory retirement can only be achieved through the European Court of Justice on the application of the ECB Council or the Executive Board. Governors of national central banks must be appointed for at least five years and may end their terms prematurely only for serious cause, notified either by themselves or the ECB council. That is, they cannot be removed by their own national governments. The long and non-renewable term is meant to avoid the possibility of

#### Box 23.2 Features important in determining the independence of a central bank

- 1 Statutory guarantees of independence or non-interference
- 2 The existence of statutory objectives for the central bank and the nature of those objectives
- 3 The methods of appointment and removal of the governor, senior officers and the board of directors
- 4 The length of the governor’s term of office
- 5 The presence or absence of government officials on the bank’s board
- 6 The extent to which the bank is bound by instructions from the government and the range of instruments at the bank’s disposal
- 7 The limits on central financing of the government
- 8 The ease with which any of the above features can be altered by government

Board members following the wishes of governments in the hope of being reappointed to their positions.

The Governing Council consists of the Executive Board plus the governors of the national central banks. Thus, the membership rose to 18 with the entry of Greece to the monetary union at the beginning of 2001. Voting, on all issues except those related to the bank's capital, is on a one-person one-vote basis, with decision by simple majority. This makes it possible for the representatives of the national central banks to outvote the Executive Board members on the Governing Council and for the smaller members to outvote large members such as Germany on all issues other than those related to the ECB's capital. This provided an extra reason for the insistence that the national central banks be politically independent.

Where the bank's capital is involved, voting power is proportional to the member states' subscribed capital and the Executive Board has no votes. The subscribed capital, in turn, is determined by equal weighting of (1) the member states' shares of the population and (2) GDP at market prices, averaged over the previous five years. Subscriptions are to be revised every five years.

The ECB is responsible for the note issue, open market operations, the setting of minimum reserve requirements and other aspects of monetary control but can make use of the national central banks to carry out open market operations. The ECB supplies liquidity to the banking system subject to the availability of 'adequate collateral' (Statute, Article 18). However, in an attempt to overcome the potential problems discussed in Section 23.2, the ESCB is not permitted to lend to governments except through the acquisition of their paper in the secondary market. Overdraft or other credit facilities by the ECB or national central banks to any EU or member state public body are explicitly prohibited by Article 104 of the Treaty.

To strengthen the control of high-spending member governments, the Maastricht Treaty forbade **excessive government deficits** and the **'bailing out'** of indebted member governments by EU governments or institutions. This should mean that member governments continue to face default risk with the consequence that bond issues of different governments should continue to carry different rates of interest to reflect the

market's assessment of the default risk associated with each government's debt issue.

In practice, this has not occurred.<sup>1</sup> There are three possible reasons for this. Firstly, the financial markets might not believe that the 'no bail out' rule would apply if a member did default on its loans. Secondly, the worry about countries running large budget deficits in a monetary union might have been unjustified because of their inability to finance these deficits through monetary expansion. Thirdly, the exercise of the Stability and Growth Pact together with the power granted by the Maastricht Treaty to the European Council to monitor economic developments in each of the member states might have been effective in persuading high spending countries to keep a tight control of their budgets.

The Maastricht Treaty separated the operation of monetary policy from the **prudential supervision** of credit institutions and the stability of the financial system. The latter remains the responsibility of the member states, although the ESCB is expected to ensure the smooth conduct of policies relating to prudential supervision and the ECB may, with the unanimous approval of the European Council and the approval of the European Parliament, be given specific tasks in this area (Article 105.6). In general, this conforms to the German model in which prudential supervision was not carried out by the *Bundesbank* but by the separate *Aufsichtsamt* (the Federal Banking Supervisory Office). The UK also changed to this arrangement with the independence of the Bank of England in 1997 when the supervisory role was taken away from the Bank and given to the Financial Services Authority (FSA).

Any attempt to place significant power in the hands of an unelected body such as the ECB raises the question of the **accountability** of that body to governments and, ultimately, to the citizens of the member states. Accountability under the Maastricht Treaty is weak, as seemed bound to be the case where the aim was to prevent as far as is possible the contamination of the central bank by the attitudes and policies of the democratic political system. What accountability there is takes a number of forms. Firstly, the ECB is subject to audit and is under the jurisdiction of the Court of Justice. Secondly, the President of the European Council and a member of the European

<sup>1</sup> See Table 21.2.

Commission are allowed to attend meetings of the Governing Council of the ECB but are not allowed to vote. Thirdly, the ECB is required to report annually on its activities to the Council and the European Parliament and the President and other members of the Executive Board are heard by the relevant committees of the parliament at either side's request.

The aim of these regulations was to create a strongly independent central bank. Indeed, it is, in a sense, more politically independent than the *Bundesbank* itself. One argument given for this view is that when the *Bundesbank* and the German government held different views regarding economic policy, the *Bundesbank* had a single and united opponent which was able to point to its electoral support. Within the monetary union, the counterpart of the German government is a group of governments which may have different political persuasions and whose countries may be experiencing different economic problems. Consequently, there is unlikely to be a single united political view to contrast with that of the Executive Board of the ECB.

In addition, the *Bundesbank* central council included the 11 presidents of the German *Länder* (regions) and this regional representation probably kept the *Bundesbank* more in touch with the real problems of the economy than is the case with the General Council of the ECB.

And yet, despite all of the attempts to preserve the political independence of the ECB, to enforce strict convergence conditions for membership and forbid loose budgetary policies, the view of both the financial markets and leading economists prior to the establishment of the single currency was that the euro, in the long term, would be a weak currency. One basis for this view was that the high proportion of intra-EU trade of monetary union members would mean that the EU would, like the USA, be a substantially closed economic area with its external trade possibly making up considerably less than 20 per cent of GDP. This, it was held, would cause the ECB to be less concerned about the external value of the euro than the *Bundesbank* was about the DM and more likely to behave like the US Federal Reserve – pursuing internal price stability but being largely indifferent to the impact of the exchange rate on foreign trade. This would make it more open to pressures for weaker monetary policy in order to stimulate economic growth, particularly given the slow growth and high rates of unemployment in much of the EU in the late 1990s. A supporting

argument was that the euro, as a broader-based reserve currency than the DM, would be less likely to be driven artificially high on occasions.

### 23.4 The form of monetary policy in the euro area

Several issues relating to the operation of policy needed to be settled in advance of 1999. There were three principal issues:

- the interpretation of the phrase ‘price stability’;
- whether to target the inflation rate directly or to target an intermediate variable such as the rate of growth of the money supply;
- the choice of the policy instrument.

#### The definition of price stability

The ECB made its own interpretation of price stability, referring to it as a ‘quantitative definition of price stability’ rather than as a target because the Bank denies that it is engaged in inflation targeting (ECB, 2001). However, we are also told that the quantitative definition ‘provides a yardstick against which the public can hold the ECB accountable’ (ECB, 2001, p. 38) and that:

‘The ECB is required to provide an explanation for sustained deviations from this definition and to clarify how price stability will be re-established within an acceptable period of time’ (ECB, 2001, p. 38)

This makes it sound close enough to a target for us to use the word. Initially, the ECB announced a price stability definition of an annual increase of less than 2 per cent in the newly developed **Harmonised Index of Consumer Prices (HICP)**. This was quickly changed to a range of 0–2 per cent to indicate that falling prices were not acceptable. This still left some concern that the policy might be too strict, particularly given the problems surrounding the use of price indexes in general and the HICP in particular. According to Eurostat, the statistics bureau of the EU, the HICP takes account of the latest economic research. However, national price indexes are probably more likely to overestimate inflation than the reverse; the same is likely to be true of the HICP.

It has been difficult to know how the ECB has been interpreting its own target range. A range of 0–2 per cent appeared to imply that the ECB would be equally



happy with an inflation rate of 0 per cent as with one of 2 per cent and that one might expect a successful monetary policy in the ECB's terms to produce a long-term average rate of inflation of around 1 per cent. This implies a very tight policy especially given the probability that the HICP overstates the true rate of inflation. Further, since we are dealing with 12 economies, an average inflation rate across the euro area of 1 per cent could well involve falling prices in some national economies. It therefore seemed unlikely that this would be the genuine aim of policy. Matters were complicated when calculations regarding money growth and velocity trends suggested that the ECB was aiming at a point target of 1.5 per cent (Svensson, 2000).

A second problem derives from the fact that the HICP is a measure of headline inflation. That is, the measure is influenced by all factors including external shocks, even if these have only short-term effects, and policy changes, although they might be intended to reduce longer-term inflationary pressure. This contrasts with some other central banks, which frame the inflation target in terms of core or underlying inflation. This seeks to measure sustained domestic inflationary pressure. The use of a headline rate leaves an element of uncertainty as to how the central bank is likely to react to an external shock. The ECB has argued that it retains a degree of flexibility because its concern is with medium-term inflationary trends – but this leaves open the question of the length of the medium term. The ECB defends the choice of a quantitative definition of price stability as a means of providing both transparency and accountability. However, this is not achieved if the meaning of the definition is unclear. In other words, the form of the target reduces the transparency of ECB decision making and leaves the financial markets uncertain about the basis of ECB decisions.

### 23.4.2 Intermediate or final target?

The ECB had to decide whether simply to target the ultimate objective – the achievement of a low inflation rate – or to choose an intermediate target through which it would hope to control the rate of inflation. The likely intermediate target was some measure of the money supply. The use of a money supply target has the advantage that the time lag between adjusting short-term interest rates and changes in the objective

are shorter than if the intermediate target is nominal income or if no intermediate target is used. Further, there are fewer exogenous influences upon it than is the case with a GNP or inflation target. However, the use of an intermediate money supply target only makes sense if there is a stable short-run demand function for money. For this reason, where the short-run money demand function had been manifestly unstable over the past 20 years, as in the UK, the use of a single money supply target had been abandoned. Germany, on the other hand, continued to use a target for broad money. Although, in practice, the *Bundesbank* had appeared to pay as much attention to the rate of inflation as to the broad money target, it had continued to recommend the use of a broad money target for the ECB. This was despite the existence of evidence that in the second half of the 1990s, the German demand for money function was starting to become unstable because of financial liberalization and increased financial innovation in Germany. As well as causing short-term instability in the demand for money function, financial liberalization had made it harder for central banks to control the money supply because it had become harder to influence relative interest rates between money and other financial assets.

This meant that there were sufficient uncertainties to make it inadvisable to depend on a single measure of the money supply as an intermediate target. A money supply target could have been based on past relationships between the money supply and inflation or on the basis of a model of the economy of the monetary union but there was a serious possibility that it would be of little use in making monetary policy decisions. In addition, a failure to achieve the single money supply target would have added to the uncertainty regarding the strength of the ECB's monetary policy.

Thus, instead of a money supply target, the ECB set a monetary growth reference point for a broad measure of the money supply, M3. M3 consists of currency in circulation plus certain liabilities of monetary financial institutions (MFIs) resident in the euro area and, in the case of deposits, the liabilities of some institutions that are part of central government (such as Post Offices and Treasuries). These liabilities included in M3 are: overnight deposits; deposits with an agreed maturity of up to two years; deposits redeemable at notice up to three months; repos; debt securities with maturity of up to two years; money market funds and money market paper (net). The monetary growth

reference value was established as the first pillar of the ECB's monetary stability strategy. The second pillar of the strategy is a broadly based assessment of the outlook for price developments and the risks to price stability, using other available indicators. These other indicators include the output gap, forecasts of economic growth and a forecast of the rate of inflation itself. Factors taken into account are considered in more detail below.

The monetary growth reference value was set at 4.5 per cent per annum and has been left unchanged. This figure was based on what the ECB referred to as the plausible assumptions of a medium-term rate of growth of 2 to 2.5 per cent per annum and an annual decline in the velocity of money of 0.5 to 1 per cent, together with the target rate of inflation of less than 2 per cent.<sup>2</sup> The ECB made it quite clear from the beginning that the figure of 4.5 per cent for monetary growth was not a target and that figures above 4.5 per cent would certainly not automatically trigger interest rate rises. The reference value is also described as a medium-term concept. In the view of the ECB, temporary deviations from it are not unusual and do not necessarily have implications for future price developments.

### 23.4.3 Choice of policy instrument

#### The choice of instrument

The ECB had first to decide upon its system for providing liquidity to the banking system. This is done principally through the main refinancing operations, weekly open market operations that provide liquidity to the banking system through repurchase agreements (repos) with a maturity of two weeks. Initially, this operated through a system of fixed-rate tenders, with the fixed rate known as the **main refinancing rate** – 'refi' for short. This rate became the focus of attention at the regular announcement of the interest rate decision of the ESCB's Governing Council.<sup>3</sup>

In a fixed-rate tender, when the total amount for which banks bid is greater than the amount the central bank is prepared to lend, each bank receives the same proportion of the amount for which they bid.

This encourages banks to bid for more than they really want since they know they are unlikely to receive all that they bid for and they know the interest rate they will have to pay on the funds they receive. This gives an advantage to large banks, which have the collateral to be able to support large bids for funds. It also makes it difficult for the central bank to judge the true demand for money in the system.

Thus, it quickly became clear that the ECB would prefer a variable-rate tender in which banks indicate how much they are willing to borrow from the central bank at various rates. A cut-off rate of interest is then declared. Bids above this cut-off rate are fully filled while bids at the cut-off rate are filled proportionately. This gives the central bank a better idea of the state of demand in the market and of market expectations about future interest rates. The official refinancing rate is then simply a minimum rate of interest – no funds are provided by the central bank below this rate but it is quite possible for funds to be lent to the banks above this rate. For this reason, the ECB was wary about changing to the variable-rate system. This was particularly the case because the large single currency economies were in recession during the first year of the ECB's operation. This had led the bank to cut the refinancing rate from 3 per cent to 2.5 per cent on 9 April 1999 and it had a clear desire at this point to keep interest rates low. During this period only about 5 per cent of total bank bids for funds were being met by the ECB and there was little doubt that the interest rate at which funds were actually provided under a variable-rate system would be higher than the minimum rate.

The change to a variable-rate tender was made on 28 June 2000. By then, the main refinancing rate was on its way up as the ECB became more concerned about inflation. Nonetheless, the ECB wished to keep interest rates as steady as possible under the new system and so moved to variable-rate tenders just after it had increased the refinancing rate by a half percentage point – a larger increase than many in the market had expected. Changing the system at that time made it less likely that the rates at which funds would actually be provided to the banks would be much above the official refinancing rate.

<sup>2</sup> This appears to give a range for inflation of 1–2 per cent, hence the suggestion in Svensson (2000) of 1.5 per cent as the point inflation target.

<sup>3</sup> Interest rate decisions are announced fortnightly, except in August when there is normally only one meeting of the Council.

The main refinancing operations of the ECB are supported by two other types of open market operations: longer-term refinancing operations and fine-tuning operations. Longer-term financing operations are conducted monthly through repurchase agreements with a three-month maturity. The purpose of these is to prevent all liquidity in the money market from having to be rolled over every two weeks and to provide access to longer-term refinancing. As their name suggests, fine-tuning operations are conducted irregularly with the aim of smoothing the impact on interest rates of unexpected liquidity fluctuations in the money market. Structural operations are also possible – these are intended to adjust the structural liquidity of the Eurosystem in relation to the banking system.

When the refinancing rate is announced by the ESCB's Governing Council, two other rates are also declared. These are the ECB's rates on its marginal lending facility and on its deposit facility. The marginal lending facility provides the possibility of emergency overnight borrowing to meet liquidity needs. The rate of interest for such borrowings is always set above the refinancing rate. On 22 January 1999, after a brief adjustment period, the marginal lending interest rate was set 150 basis points (1.5 per cent) above the main refinancing rate. From 9 April 1999, this difference was reduced to 100 basis points (1 per cent) and the gap between the two rates has remained unchanged from that date. The deposit rate applies to overnight deposits and is always set below the refinancing rate. The gap between these two rates has stayed steady at 100 basis points (1 per cent) since 9 April 1999. The main refinancing rate (refi) is by far the most important of the ECB's rates.

Another question was whether to support the control of short-term interest rates with the requirement that banks hold mandatory **minimum reserve ratios**. Before monetary union, this was practised in the majority of EU member countries in the belief that it allowed the central bank more easily to manage short-term interest rates by creating a predictable demand for reserves at the central bank under circumstances in which bank balance sheets were growing rapidly in response to increased demand for credit. However, because reserves held at the central bank usually do not receive interest, the ratios act as a tax upon banks and as the required reserves grow banks push up interest rates on loans to make up for the lost interest and to restore their overall rates of profit. This in turn

#### More from the web

Central bank websites are good sources of material on monetary policy in Europe. For the internet addresses of all 25 EU members, see the ECB's website: [www.ecb.int](http://www.ecb.int). On the right-hand side of the home page, you will find 'Links to EU centralbanks'.

puts downward pressure on the demand for credit. The Bank of England argued that minimum reserve ratios were not required in deep and liquid financial markets since the central bank could achieve its objectives in such markets solely through open market operations. In addition, it was suggested that the use of minimum reserve ratios conflicted with the Maastricht Treaty requirement that policy should be conducted in accordance with the principle of an open market economy with free competition, favouring an efficient allocation of resources.

Despite these objections, the ECB settled for a minimum reserves system with banks required to hold with the national central bank members of the ESCB a reserve ratio of 2 per cent of the liability base. This was defined to include: overnight deposits; deposits with agreed maturity up to two years; deposits redeemable at notice up to two years; debt securities issued with agreed maturity up to two years; and money market paper. A lump-sum allowance of €100,000 may be deducted from an institution's reserve requirement. The Governing Council argued that without the use of a minimum reserve system, the ESCB would be faced with a relatively high volatility of money market interest rates and would need to engage frequently in open market operations. This could undermine the operational efficiency of monetary policy as markets have difficulty in distinguishing policy signals made by the ECB from technical adjustments necessary to reduce the volatility of interest rates. Further, it argued that a reserve ratio system would safeguard the role of national central banks as providers of liquidity to the banking system. However, the Council acknowledged the burden that such a system places on banks if reserves are required at the central bank without the receipt of interest. It thus decided to pay interest on the required minimum reserves holdings at the ECB's main refinancing interest rate.

### 23.5 ECB monetary policy and the euro

It is difficult to judge the effectiveness of ECB monetary policy. Firstly, we must allow for the time lags in monetary policy and accept that the performance of the euro area economy in 1999 and perhaps a good proportion of 2000 had more to do with the monetary policies of the central banks of the member countries before 1999 and with the attempt by various governments to meet the Maastricht convergence criteria. Secondly, despite the setting of an inflation target and a monetary growth reference value, it has not been easy to know precisely what the ECB has been attempting to do.

In practice, the interest rate decisions appear to suggest that a medium-term average rate of inflation of 2 per cent would be perfectly acceptable and that monthly figures between 2 and 3 per cent do not, in themselves, suggest a failure of policy. Thus, the Governing Council appears to become concerned when the monthly rate moves above 2 per cent only if there is evidence of growing inflationary pressure that would continue in the medium term, pushing the rate higher. However, it is difficult to know how long the medium term is in the minds of the members of the Governing Council. It has also been difficult to determine the attitude of ECB members towards the desired value of the euro.

We have mentioned the doubts that surrounded the likely policy of the ECB and hence the likely strength of the euro following its launch in January 1999. The constitution had been designed partly to convince the markets that the euro area would be a low inflation area with a strong currency. However, the ECB was a new institution and new institutions ultimately only establish a reputation through their behaviour over a number of years. In January 1999, no one knew precisely how the ECB would behave.

Despite these doubts, no one forecast the dramatic fall that took place in the value of the euro, particularly against the US dollar and the Japanese yen, in its first two years of life. The extent of this fall is shown in Table 23.1. The euro, having begun trading on 4 January 1999 at a rate of €1 = \$1.1743 rose on the first day to close in New York at \$1.18738. However, from then until the close on 26 October 2000 (when it seemed to have finally reached its low), the euro fell 30.3 per cent against the dollar, 32.9 per cent against the yen and 19.7 per cent against the pound sterling.

**Table 23.1** Exchange rates of the euro against the dollar, the yen and sterling, 1999–2004

Date	\$/€	¥/€	£/€
4 Jan 99	1.18738	133.159	0.71556
1 Feb 99	1.13027	130.046	0.68874
1 Jun 99	1.04463	125.483	0.64863
1 Oct 99	1.07172	112.627	0.64761
27 Jan 00	0.98947	103.804	0.60455
1 May 00	0.91240	99.322	0.58664
1 Sep 00	0.89942	95.140	0.61559
26 Oct 00	0.82733	89.672	0.57764
11 Jan 01	0.95246	111.922	0.63610
18 May 01	0.87690	108.495	0.61340
3 Jul 01	0.84786	105.54	0.60307
10 Sep 01	0.89907	108.85	0.61636
11 Sep 01	0.91277	108.70	0.62070
2 Jan 02	0.90343	119.28	0.62512
1 Mar 02	0.8541	115.40	0.60995
3 Jun 02	0.93927	116.17	0.64241
3 Sep 02	0.99582	116.65	0.63722
7 Nov 02	1.00927	122.37	0.63825
2 Jan 03	1.03632	124.21	0.64856
7 Mar 03	1.10162	128.29	0.68755
2 Jun 03	1.17452	139.22	0.71757
2 Sep 03	1.08734	126.26	0.69648
1 Dec 03	1.19542	131.04	0.69460
9 Jan 04	1.28514	136.88	0.69599
1 Apr 04	1.23594	128.16	0.66576
1 Jun 04	1.22112	134.86	0.66741

Source: Pacific Exchange Rate Service:  
<http://fx.sauder.ubc.ca>

It then recovered briefly but soon fell back to below a rate of €1 = \$0.90. In the first half of 2002, however, it began a steady climb, rose above parity towards the end of 2002 and reached new highs in late 2003. In January 2004, the euro reached a peak of \$1.28514 before again falling back. In June 2004, the euro was close to its starting rate against the dollar and the yen and only 7 per cent weaker against the pound. Looking at exchange rates at that time led one to wonder what all the fuss over a weak euro had been about. Was it not simply the result of the daily rough and tumble of the foreign exchange market, which often is of little medium-term importance?

Nonetheless, it is worth enquiring into the many reasons for the early falls. Its fall against the US dollar

was partly a reflection of the strength of the US dollar as the US economy continued to grow rapidly and European firms invested heavily in the USA.

In addition, because the markets had no clear notion of how low the ECB was prepared to see the euro fall before it took action, market agents frequently ‘tested the market’ – they sold euro to see if falls would produce some indication of likely future action by the ECB. This doubt about the policy likely to be followed by the central bank was increased by the tendency of members of the Executive Board to make conflicting statements about the euro. The markets did not like this apparent lack of leadership. Nor were they convinced that the ECB would, despite its constitution, be truly immune from political pressure. This concern was strengthened by the confusion over the length of the term of office of the first President of the ECB, Wim Duisenberg of the Netherlands.

Duisenberg was appointed in 1998 to serve an eight-year term. However, there had been conflict over his appointment because of the fear of some member states, notably France, that Duisenberg’s approach to policy would be too conservative and that monetary policy might be deflationary. It was generally understood that there had been a behind-the-scenes agreement that Duisenberg would not serve his full term of office and would be replaced by a French nominee, although the exact terms of the agreement were unclear. There was a widespread view that Duisenberg would serve only four years, although he consistently denied this. In the event, in February 2002, he announced that he would be retiring from the job on his 68th birthday, on 9 July 2003. By then, he had served just over five years of his term of office.

In addition to the worry about leadership, because the euro was a new currency, there was no firm view as to the long-run exchange rate indicated by economic fundamentals. The starting exchange rate of the euro was simply a weighted average of the values of the 11 participating currencies at the end of December 1998. There was no reason to believe that the new currency would behave in the same way as this weighted average had done before 1999. Indeed, it was probably the case that recessions in the major economies would have a more depressing impact on expectations about the future of the European economy than was suggested by the weights applied in the old ERM.

Under these circumstances, other factors that might normally not have had much impact on the currency provided additional excuses for selling the euro. These

included the resignation of the President and members of the European Commission and the NATO bombing of Serbia and Kosovo. The feeling was that only genuine news about improved fundamentals of the currency would push the value of the euro up, whereas it would fall merely because of rumour and political uncertainty. Thus, the fall resulted from a mixture of genuine economic news, the existence of uncertainty about the attitudes of the authorities and a variety of short-term political factors. The doubts about when the euro would ‘bottom out’ encouraged speculators to continue to sell the euro.

For most of 1999, the ECB was able to take a relaxed view of the value of the euro. At this time, the major European economies were in recession with high levels of unemployment and low rates of growth. There was little inflationary pressure in these economies and the HICP showed inflation rates well within the ECB’s target range of 0–2 per cent. This is shown clearly in Table 23.2, which sets out changes in the ECB’s main refinancing rate since January 1999, together with inflation, unemployment, and money growth rate figures over the period for the euro area. We need to note that at the beginning of 2001, Greece became a member of the euro area, requiring some small adjustment of the statistics. We should also note that the base of 100 for the HICP represents average 1996 prices. At the beginning of the operations of the ECB in January 1999, the HICP stood at 102.8.

In the first half of 1999, there was little desire to invest within Europe and the ECB was able to keep interest rates low to help the recovery of the European economy. The HICP remained almost stationary for much of the year. The ECB’s initial interest rate of 3 per cent was lowered in early April to 2.5 per cent and was then left unchanged for seven months. By November, however, although the inflation rate was still well within the target range, it had begun to rise. The monetary growth rate had climbed to 6.2 per cent, the euro was plunging towards parity with the dollar and unemployment, while still high, was beginning to fall. The ECB responded to what they saw as developing inflationary pressure by pushing the main refinancing rate back to 3 per cent.

The euro continued to fall, breaching parity with the dollar for the first time on 27 January 2000. Despite a temporary fall in January 2000, the monetary growth rate remained well above the reference value and unemployment continued slowly to decline. The ECB responded with a series of quarter-point interest rises

**Table 23.2** Inflation and unemployment rates, money growth rate and official interest rate for the euro area, January 1999–February 2002

Date		Inflation rate <sup>1</sup>	Money growth rate <sup>2</sup>	Unemployment rate <sup>3</sup>	Interest rate <sup>4</sup>
1999	Jan	0.8	5.8	10.4	3.0
	Apr	1.1	5.3	10.2	2.5 (9 April)
	Aug	1.2	5.7	10.0	2.5
	Oct	1.4	5.7	9.8	2.5
	Nov	1.5	6.2	9.7	3.0 (5 Nov)
2000	Jan	1.9	5.3	9.5	3.0
	Feb	2.0	6.2	9.4	3.25 (4 Feb)
	Mar	2.1	6.6	9.3	3.5 (17 Mar)
	Apr	1.9	6.7	9.2	3.75 (28 Apr)
	Jun	2.4	5.3	9.0	4.25 (9 Jun)
	Sep	2.8	5.0	8.8	4.5 (1 Sep)
	Oct	2.7	4.9	8.7	4.75 (6 Oct)
GREECE JOINS EURO AREA					
2001	Jan	2.4	4.5	8.5	4.75
	Apr	2.9	3.9	8.3	4.75
	May	3.4	4.5	8.3	4.5 (11 May)
	Jul	2.8	5.6	8.3	4.5
	Aug	2.7	5.9	8.3	4.25 (31 Aug)
	Sep	2.5	6.9	8.0	3.75 (18 Sep)
	Oct	2.4	7.3	8.0	3.75
	Nov	2.1	7.7	8.0	3.25 (9 Nov)
2002	Jan	2.5	7.7	8.1	3.25
	Jun	1.9	7.1	8.3	3.25
	Sep	2.1	7.1	8.3	3.25
	Nov	2.3	7.0	8.4	3.25
	Dec	2.3	6.9	8.5	2.75 (6 Dec)
2003	Jan	2.1	7.2	8.7	2.75
	Feb	2.4	7.9	8.7	2.75
	Mar	2.4	7.9	8.8	2.5 (7 Mar)
	May	1.8	8.7	8.8	2.5
	Jun	1.9	8.3	8.8	2.0 (6 Jun)
	Oct	2.1	8.1	8.8	2.0
	Dec	2.0	7.0	8.8	2.0
2004	Jan	1.9	6.5	8.8	2.0
	Mar	1.7	6.3	8.8	2.0
	Apr	2.0			2.0

<sup>1</sup> Annual rate of growth of Harmonized Index of Consumer Prices

<sup>2</sup> Annual rate of growth of M3

<sup>3</sup> Unemployment as a percentage of the labour force

<sup>4</sup> ECB's main refinancing (refi) rate at the end of month (date of interest rate change in brackets)

Source: *Monthly Report*, various issues, tables 2.4, 4.1 and 5.4, Frankfurt am Main, European Central Bank (ECB, 1999, 2000, 2001, 2002, 2003, 2004), information can be obtained free of charge from the ECB, in particular from [www.ecb.int](http://www.ecb.int)

in February, March and April and a half-point rise in June. Under this pressure, monetary growth fell back towards the reference value and the euro picked up to some extent. This was misleading since it began to fall again sharply in August and September. Meanwhile the inflation rate continued to rise, reaching 2.8 per cent in September. The ECB appeared now to be genuinely concerned about the possible inflationary effects of the weakening currency. Interest rates were again increased in September, and on 22 September 2000 the ECB joined with the central banks of the USA, Japan and the UK to purchase euro in the attempt to prop up the currency. This, together with a further interest rate rise in October, had no immediate effect and the euro reached a low of \$0.825 during the day's trading on 26 October.

Nonetheless, the euro area economy appeared soon after to be responding to the ECB's rate rises. By January 2001, the inflation rate had fallen towards the target range; the monetary growth rate had reached the reference value for what was to turn out to be the only month of the first 36 months of the operation of the ECB; and the fall in unemployment had virtually come to a halt. The ECB felt able to relax. Following the October 2000 increase, the main refinancing rate was left unchanged for seven months. During this period, however, the US economy had started to head toward recession and fears of a global recession had begun to emerge. The Federal Reserve had begun to slash US interest rates and the financial markets were expecting the ECB to follow suit. The problem for the ECB was that monetary growth was again heading for 5 per cent and the inflation rate was under pressure from rising world oil prices as well as the weak euro. The impact on the HICP of the temporarily high world oil price provides a good example of the problem of using a headline rate of inflation as the target of monetary policy. It is at least possible that the ECB was unduly slow to cut interest rates because of the high rate of inflation as shown by the HICP, which reached a peak of 3.4 per cent in May 2001.

Following the May cut, the ECB resisted pressure for further cuts until the end of August. In the period between May and August, the inflation rate began to decline but remained well outside the target range. Monetary growth continued to rise. The 11 September attack on the World Trade Center in New York and the Pentagon in Washington DC led to increased worries about world recession and the ECB responded with a half-point cut in rates on 18 September and a

further quarter-point cut in November. By this time inflation had fallen to 2.1 per cent, just outside the target range.

The monetary growth rate continued to climb but this was dismissed by the ECB. It argued that the relatively high growth of M3 was the result of people shifting into the liquid and relatively safe short-term assets that make up M3 because of the uncertainty following the September 11 attacks. Support for this view was drawn from the fact that the growth of private sector credit had been continuously falling over recent months. The ECB felt that the main refinancing rate, which stood after the November cut at 3.25 per cent, had been reduced sufficiently. There was some criticism that the ECB was not responding sufficiently to the threat of world recession. In 2001, the US Federal Open Market Committee had reduced the Federal Funds rate by 4.25 percentage points (from 6 per cent to 1.75 per cent) while the ECB had cut its main refinancing rate from only 4.75 per cent to 3.25 per cent. Even the UK's MPC had cut its repo rate by more (from 6 per cent to 4 per cent) despite the fact that the UK economy appeared to be better placed to withstand a world recession than the large economies in the euro area.

However, the ECB continued to feel that it had done enough and did not make another change until December 2002. Then, with the inflation rate still just outside the target range and with money supply growth still well above the reference range, the ECB felt able to cut the refi rate by 50 basis points. The key to this decision was the continued sluggishness of euro area economies, the stubborn refusal of unemployment to fall below 8 per cent and the upward movement of the euro above parity with the US dollar. This reduction clearly had little effect – the euro continued to increase in value but little else changed. Further cuts in the refi rate followed in March and June 2003. By then, the refi rate had fallen 275 basis points from the peak reached in late 2000, more than the 250 basis points fall in the UK's repo rate. Of course, by this time the Fed Funds rate had fallen to 1 per cent and the euro continued to rise, threatening the exports of the large euro area countries. By 2004, talk was again of rising interest rates. Interest rates in the UK were already on the way up and were expected to rise in the USA if not before, then soon after the presidential election in November. The ECB had at least given itself the possibility of resisting the upwards movement for a little time.

In the light of the performance of the euro and the targets established for itself by the ECB, what can we say about European monetary policy since 1999? Much depends on the interpretation of the ECB's quantitative definition of price stability. If the Bank had been aiming for the midpoint of the 0–2 per cent range, it had clearly not been too conservative since for much of the period the HICP grew at more than 2 per cent per annum. In the 64 months, up until the end of April 2004, during which the ECB has been responsible for monetary policy, the inflation rate has been within the 0–2 per cent range in only 25 months, most of which were in the early months of operation of the ECB when the inflation rate was being influenced more by the separate monetary policies in existence before 1999 than by anything done by the ECB. Indeed, inflation was outside of the range for 24 consecutive months from June 2000 to May 2002.

If, however, one interprets the 0–2 per cent range liberally and is willing to make adjustments to the headline inflation rate of the HICP, one could argue that there might well have been scope to cut the refi rate earlier and faster in 2002 and 2003, particularly to aid the large, slow-growing economies of Germany, France and Italy. The problem in judging the success of ECB policy is that it is sufficiently opaque to leave us uncertain regarding the Bank's precise intentions. Part of the problem stems from the dubious position of the monetary growth reference value. The ECB has retained the monetary growth reference value as 4.5 per cent, but there has been a tendency to attribute growth rates above this level to temporary and irrelevant factors. It seems odd, then, that monetary growth continues to be acknowledged as the 'first pillar' of policy when all that occurs is that 'developments of M3 are continuously and thoroughly analysed by the ECB in the broader context of other monetary indicators and information from the second pillar to assess their implications for the risks to price stability over the medium term'.<sup>4</sup>

### 23.6 Possible reforms at the ECB

The ECB has faced criticism because of both its perceived lack of transparency and accountability and its

monetary policy strategy. Svensson (2000) suggests that claims by the ECB that it is open and credible carry little weight when it is clear that it is less accountable than the central banks of New Zealand, Sweden and the UK. We have seen that there has been a particular problem with the ECB, that it has been difficult to understand the Governing Council's interpretation of its mandate and, hence, difficult to judge its success. The problem of transparency is looked at in detail in Chapter 14. See also Case Study 6.

Suggested reforms of the ECB have included the publication of an inflation forecast and greater openness regarding the voting record and decision-making process of the Governing Council. As we have seen, the monetary strategy criticisms have concentrated on the inflation targets set and the role of the monetary growth reference value in the policy deliberations. Proposals have included the move to the use of a core rate of inflation in place of the headline rate provided by the HICP and a raising of the target rate to a range of 1–3 per cent. There has been no suggestion, however, that the euro area should move to the UK system of having the inflation target set by the political system.

### 23.7 Summary

In a currency area with completely fixed exchange rates *and* full freedom of capital flows, there must be a common monetary policy. Such a policy could be determined by a single leader or on the basis of a joint decision by governments or central banks. The EMS did not have both fully fixed exchange rates and fully mobile capital but the Deutschmark had been the strongest currency in the system partly because of Germany's reputation for low inflation and partly because the political independence of the *Bundesbank* was seen as a guarantee that low inflation would continue. With monetary union, a supranational central bank, the European Central Bank, was established to conduct the common monetary policy. Its constitution was designed to make the ECB politically independent.

Many of the decisions made about the European Central Bank in the Treaty on European Union can be

<sup>4</sup> ECB, *Monthly Report*, December 2001, p. 5.



explained by a consideration of the fears which prospective members had about the operation of the system. Above all, there was the fear that the common monetary policy might be inflationary. This was thought possible to the extent that the policy became a compromise among countries with different attitudes towards inflation. Thus it was deemed necessary to design a set of institutions that would overcome the potential problems.

The Maastricht Treaty thus modelled the European Central Bank on the *Bundesbank* and included rules aimed to prevent member countries from running excessive government deficits. Despite this, financial markets still had doubts about the likely strength of the euro. The ECB sought to overcome this by designing a monetary policy that stressed price stability. It chose a target rate of inflation of 0–2 per cent and set

a monetary growth reference point although this was to be only one of the two pillars of its policy. Its judgments on interest rates also take into account a set of other indicators including the rate of inflation itself. The ECB followed the *Bundesbank* in choosing a system of reserve ratios for commercial banks.

Despite everything that was done to convince the markets before January 1999, the ECB was a new institution and had no reputation. The markets were thus uncertain as to how it would act. In practice, there appeared to be no clear leadership and the markets responded to the climate of uncertainty and the weakness of the European economy by pushing the value of the euro sharply down against the dollar. Recently, however, it has again risen above its starting value in 1999. The ECB's monetary policy has been criticized for its lack of transparency.

### Key concepts in this chapter

Currency area  
Common monetary policy  
ECB  
Price stability  
Prudential supervision  
Currency substitution  
Harmonised Index of Consumer Prices

To bail out a bankrupt country  
ESCB  
Excessive government deficits  
Accountability  
Minimum reserve ratios  
Main refinancing interest rate (refi)

### Questions and problems

- 1 Explain the conflict between a low-inflation policy and a weak euro.
- 2 Why was it thought that a monetary union with many members would be more inflationary than one with only a few members?
- 3 Why might credit-rating agencies rate a country's debt denominated in its own currency more highly than its debt denominated in a foreign currency?
- 4 Why might it be undesirable for all the members of a monetary union for one member to default on its government debt?
- 5 Does it matter if a country's central bank is only weakly accountable to the country's political institutions?
- 6 Compare and contrast the monetary policy system and practice of the Bank of England with those of the European Central Bank.
- 7 Why might interest rates differ in different countries, even within a monetary union?
- 8 What has happened to the value of the euro since June 2004? Can this be explained by the factors discussed in the text or have other issues become important?
- 9 What reasons are there for a country or monetary union wanting to have a strong currency?

## Further reading

P De Grauwe, *The Economics of Monetary Union* (Oxford: Oxford University Press, 5e, 2003)

European Central Bank, *The Monetary Policy of the ECB* (Frankfurt: ECB, 2001)  
downloadable from [www.ecb.int/pub/pdf/monetarypolicy2001en.pdf](http://www.ecb.int/pub/pdf/monetarypolicy2001en.pdf)

European Central Bank, *Monthly Report*.

L E O Svensson, 'The first year of the eurosystem: inflation targeting or not?',

*American Economic Review, Papers and Proceedings*, 90 (2), 2000, 95–9

### Websites

[www.econ.yale.edu/~Corsetti](http://www.econ.yale.edu/~Corsetti)

[www.ecb.int/home](http://www.ecb.int/home)

<http://fx.saunders.ubc.ca> (Pacific Exchange Rate Service)

## Chapter 24

# Financial innovation

*What you will learn in this chapter:*

- Why financial innovation takes place
- How regulation, technology and the changing economic environment combined in the stimulation of off-balance-sheet activity and liability management
- How financial innovation can pose problems for financial regulators and for the conduct of monetary policy

## 24.1 Introduction

One function of a financial system is to channel funds between the end users of the system, that is to say from surplus to deficit units. In so doing, the components of the system – markets and institutions – provide a range of services for which ultimate lenders and borrowers are prepared to pay. Some measure of the value end users place upon the facilities can be gained from the commissions, fees and spreads charged by providers of the services. As with any other profit-driven economic activity, suppliers are looking continually for products which can be differentiated (or at least presented as differentiated) from those of their competitors and for ways of finding competitive cost advantages. The result is a continually evolving menu of financial products and processes.

However, not all new products and processes survive. This leads some commentators (for example, Finnerty, 1992) to distinguish between ‘trivial’ and ‘non-trivial’ innovations. The latter are those that continue to supply a need even after the original stimulus to their development has disappeared. The fact that there seems still to be a place for lasting innovations is often taken as evidence that financial markets are still ‘incomplete’.

The difficulty of distinguishing between ‘trivial’ and ‘non-trivial’ innovations, however, is that it can only be done with hindsight. This is fine for financial commentators and the writers of textbooks but it is very difficult for practitioners – people working in the financial services industry – to know which of the changes taking place all around them are changes that really matter for the industry and its clients and which are transient and of little consequence. The Centre for the Study of Financial Innovation, whose work we refer to on the next page, is an independent ‘think-tank’ with a predominantly professional membership. It is clear from the range of its work and interests that it is obliged to treat almost every current development as a potentially significant financial innovation.

Financial innovation, therefore, is no more a novelty of the 1990s than is innovation in consumer durables. Indeed, financial innovation is not even confined to recent times. In Chapter 12 we noted that money today consists largely of bank deposits – the liabilities of private firms working for profit – and that this poses considerable difficulties for the authorities which often wish to control the growth of money. From a monetary point of view, therefore, the developments

which replaced precious metals and then notes and coin with bank deposits were amongst the most important and these took place in the sixteenth and nineteenth centuries. Partnerships and lotteries are two more examples of what were once upon a time ‘innovations’, designed to help raise finance for firms and for the state respectively.

Continuous as the process of financial innovation may be, however, the innovations of the 1980s and 1990s can be seen as the latest stage or phase of a longer wave of rapid change which dates from the mid-1960s. Sametz (1992), for example, identifies the first stage, running from 1965 to 1972, when a combination of regulatory inflexibility and rising inflation and interest rates produced the first certificates of deposit and money market mutual funds. The second phase ran from 1973 to 1982, when the increased volatility of interest, inflation and exchange rates combined to produce hedging instruments such as options and futures contracts. The third phase, running from 1982, has been driven by increased volatility in security prices, of which the 1987 crash is the most conspicuous example, and by increased merger and acquisition activity.

In this chapter we shall look firstly at some of the theories which try to explain why financial innovation takes place. There is no completely satisfactory theory of financial innovation. As we have just seen, different ‘causes’ are likely to appear at different times. Then, in Section 24.3, we shall look at two cases, off-balance-sheet activity and retail liability management, which illustrate the interaction of regulation, technology and the economic environment as ‘causes’ and show how they in turn produce new dilemmas for the regulatory authorities. These are only two of many innovations. Many of the others, particularly where they involve the development of new products in new markets, are treated in detail elsewhere in this book and we shall make cross-references to them as appropriate. In Section 24.4 we look at the impact of retail liability management on the demand for money and the conduct of monetary policy. This section, therefore, returns us to some of the important issues raised earlier in Chapters 12, 13 and 14. Section 24.5 summarizes.

## 24.2 Theories of innovation

The immediate cause of innovation is the prospect of profit. It is driven by the desire, on the one hand, of

financial firms to increase profit and by the desire, on the other, of lenders and borrowers to be able to carry out their lending and borrowing on terms which offer them the prospect of a greater increase in their wealth for a given level of risk than was available previously. But this rather basic statement of economic motivation does not take us very far. It merely raises the subsequent question of why the possibilities of profitable innovation occur when they do and in particular why they seem to occur more at certain times than at others. The answer to this must be that profitable opportunities arise with changes in the economic environment. It is when we try to identify the relevant

changes that the picture becomes complicated. What sort of changes in the economic environment are important in stimulating financial innovation?

When it comes to explaining the burst of innovative activity since the 1960s, the three most frequently cited influences are: *regulation* (and *deregulation*), *technology* and *volatility*. The economic environment has been changed by all three of these over the past 40 years or so, and all three are undoubtedly relevant but they interact in a continuous and complex way and so the challenge becomes one of imposing some sort of order. This can be done either by chronology in which one influence dominates at a particular time (as with Sametz above); or by treating some as acting upon demand (for example, volatility) and others (for example, technology) upon supply; or by treating some as originating outside the financial system itself, volatility and technology being the most promising candidates, in that order, while others are seen as originating within the financial system initially as a response to the other disturbances but then helping to carry the developments forward. Following this approach, one can distinguish between ‘exogenous’ and ‘endogenous’ factors. The brief survey here is organized chronologically. We look firstly at regulation as something that has always been present in financial systems and has always been an inducement to innovation; then we look at volatility and technological change, which are amongst the circumstances peculiar to the 1970s and 1980s, Sametz’s second and third waves. But, before we begin, we take a look at Table 24.1, which tries to impose some order on what is a very complex picture. (See Lewis and Mizen (2000) tables 12.1 and 12.2 for a slightly different approach.) Notice that it is divided into three columns. The first of these is headed ‘causes’ and contains the three most relevant environmental changes that we have just listed. In the second column, we have listed the innovations (products and services) for which each of these causes was largely responsible. This is a simplification, since most innovations were influenced by more than one cause, but it is reasonable to argue that in most cases there was a principal cause, more important than the other two. The third column we have headed ‘consequences’. This is because we want to emphasize the broader significance of these innovations. Each innovation has its own justification in providing a product or service that consumers regard as an improvement on what went before. But some innovations have a wider significance for monetary

### More from the web Studying financial innovation

The CSFI is an independent think-tank formed in early 1993 to stimulate research into the future of the financial services industry. It publishes a quarterly *Newsletter*, regular *CSFI Reports* on specific issues and an *Annual Report*. It also organizes frequent ‘round table discussions’ on specific topics of interest to the financial services industry. The range of issues that it chooses to address, as reflected in its *Reports* and ‘round tables’, illustrates just how difficult it is for people working in a rapidly evolving industry to monitor, understand and assess the significance of all the developments that are taking place. The three round tables planned for June 2004 were on ‘The European Banking Industry Committee’, ‘Mortgage Funding for Europe’ and ‘The Implosion of the Professional Indemnity Insurance Sector’. Which of these issues, if any, eventually give rise to significant financial innovations we can only wait and see.

The CSFI’s website is at: [www.csfi.org.uk](http://www.csfi.org.uk)

Financial innovation is a topic which is inevitably of interest to central banks and to regulators, and their websites frequently publish material on the issues which they think is important. One particularly interesting paper was published in 2002 by the Federal Reserve Bank of Atlanta. Written by W Scott Frame and Lawrence J White it searches the literature for *empirical* studies of financial innovation since 2000. Remarkably, they report that there have only been two dozen such papers and that these addressed only 14 significant ‘innovations’. The paper, entitled ‘Empirical Studies of Financial Innovation’ can be found at: [www.frbatlanta.org/filelegacydocs/wp0212.pdf](http://www.frbatlanta.org/filelegacydocs/wp0212.pdf)

Table 24.1 Financial Innovation

Causes	Results	Implications
Regulation and deregulation	Eurodollar markets Money Market Mutual Funds CDs 'Bill leak' Off-balance-sheet activity Increased competition	Money substitutes New monetary instruments Evade quantity controls Securitization Rise in money's own rate Money's own rate market related Liability management
Volatility	Swaps Options Futures Variable rate lending	Risk reduction Loan demand less interest elastic
Technology	Globalization 24hr markets Programme trading Derivatives ATMs EFTPOS Credit checking Cheaper intermediation Cheaper entry (contestable markets)	Economies in cash holding Larger debit and credit positions (fall in velocity) Liability management Credit derivatives

and financial economics. This is often because they change agents' behaviour in a major way which in turn forces us to change our view of how a modern monetary economy works. Quite often, this change in behaviour causes problems for the authorities, which find that their monetary and financial policies, based on old patterns of behaviour, are less effective than they were. As the table shows, not all new products and services have this wider significance.

We turn now to the argument that regulation has long been central to the process of financial innovation. This is most strongly associated with Kane (1981, 1984, 1988), who coined the term **regulatory dialectic** to describe the continuous interaction between financial firms which seek to minimize the burden of regulation and the authorities which modify the rules of regulation in response to the latest products and practices of financial firms. Kane's thesis was based largely upon US experience and the circumstances surrounding the growth of Eurodollar deposits, the growth of repurchase agreements and money market mutual funds. The first developed after 1966 while

the others took off in the 1970s. All were a response to **Regulation Q**, which limited banks' ability to pay interest on deposits. The regulation was circumvented in the first case by overseas US banks whose deposits were outside US jurisdiction; in the second case by repurchasing at a loss securities lent for a specified period (the loss amounting to interest); and in the third case by pooling retail deposits and investing them in short-term money market instruments (which became technically the source of the interest) while allowing withdrawals on demand. In the UK, an obvious parallel was the 'bill-leak' which occurred at intervals in the 1970s when the 'corset' or supplementary special deposits scheme was in operation. Under the corset, banks were limited to target rates of growth in their interest-bearing liabilities (roughly, interest-bearing deposits) and were subject to financial penalties on a scale which increased steeply with the degree of overshoot. Like all direct controls, the corset frustrated both sides of the market with the predictable effect that eventually both sides would collude in circumvention. Circumvention began with large corporations

borrowing in the money markets by issuing their own commercial bills but developed rapidly when firms discovered that the discount on the bills (the cost of funds) would be much smaller if the bills carried the guarantee of a major bank. The advantage to banks was that the fee income from these ‘acceptances’ partly replaced the interest income forgone on the loans they were prevented from making. This incident introduced UK banks to the advantages of ‘off-balance-sheet’ activity which developed rapidly in many directions thereafter. Chapter 13 discusses banks’ involvement with ‘swaps’, another example of off-balance-sheet activity, and Chapter 24 discusses some of the regulatory issues that are raised by banks engaging in business which is not represented in the structure of assets and liabilities in their balance sheets.

Both Hester (1981) and Silber (1983) similarly emphasize the role of regulation. Hester also focused on innovations in the US after 1960. Many of these, he concluded, were the result of monetary policy decisions and the outcome of most was beneficial since regulation led to inefficiency. A feature of Hester’s argument, however, was the simultaneous emphasis upon the underlying conditions which made innovation worthwhile. These included high and variable interest rates (which determined the ‘cost’ of Regulation Q) and the progress in information technology which lowered the cost of circumventory action. In Silber, regulation appears as a special case in a more general theory of innovation. Financial firms are assumed to maximize utility (essentially profit) subject to a balance sheet constraint. Innovation is thus a profit-oriented response to some externally imposed constraint. Innovation is usually a response to *changes* which may either force a reduction in the utility of the firm or increase the cost of adhering to the constraint. Within this framework, a new regulation reduces utility while changing conditions (such as higher interest rates) may make compliance more costly.

Financial innovation also occurs at times and in places where regulation is not an obvious burden to intermediaries. Indeed, some of the most far-reaching (in their effects) innovations in the UK in the 1970s and 1980s came about during periods of overt slackening of regulation. **Competition and Credit Control (CCC)** facilitated the first stage of liability management while legislation in 1983 and 1986 to put banks and building societies onto a more equal footing took it a stage further (as we shall see in Section 24.3). For this reason alone, some attention to the underlying economic conditions

is required. As we have seen, both the level and volatility of interest rates have been cited as instrumental in the inducement to innovate, either in conjunction with regulation (by determining the cost of compliance) or alone (by increasing the level of financial risk).

We saw earlier that Sametz regards **financial volatility** as central to the innovation process since the 1970s. Balance of payments surpluses and deficits have been both absolutely larger and larger also in relation to their respective GDPs than at any earlier period. Commodity prices have shown larger swings and nominal interest and exchange rates have also been extremely volatile. Recall (from Chapter 16) that a doubling in nominal interest rates will almost halve the value of a long-dated fixed interest bond and interest rates often doubled and halved in the 1970s and 1980s. Relevant information about future price movements thus became increasingly expensive, if not impossible to obtain, and accordingly (on this view) it has been markets and intermediaries that have been able to develop practices and products that help to manage the risk associated with price and rate fluctuations that have prospered. It is no coincidence that the most rapid growth in the 1970s and 1980s has taken place in financial futures (Chapter 19), interest rate and currency swaps, and traded options markets (Chapter 20). The growth of variable rate lending in US banking is another obvious response to volatility. This increase in the instability of financial and economic conditions, as we have seen, is generally recognized even in quarters where other stimuli are also thought to have been critical. Both Goodhart (1986) and Lewis (1988) have given it particular emphasis.

Whether it comes as a response to the frustrations of regulation or in response to increasing risk, financial innovation takes place only when it seems likely to be profitable. The role of technology in financial as in other activity is to lower the costs of production and possibly also the costs of entry. We take firstly the costs of production.

Conventional banking operations were once very labour intensive. Furthermore, those activities that required the storage and transmission of information were limited by the speed with which paper and people could be moved from one place to another. The development of ever more powerful and compact computers and more importantly the simultaneous development of communications networks allowing remote operators virtually instant access to centrally stored information has widened the range of services

financial firms can offer. It has also increased the speed with which those services can be supplied, lowered their cost, changed dramatically the conditions (and locations) of work for those employed in the industry and changed the relationship between the supplier and consumer of financial services.

At one extreme, one thinks of the high speed and low cost with which firms based in London can transact business in Tokyo or New York, through their local subsidiaries. Indeed, the existence of local subsidiaries is itself dependent upon the cheap and instant interchange of information between the subsidiary and head office. The globalization of money and capital markets would simply not have been possible without these developments.

Equally, the development of new instruments and their markets would not have been possible without the facility of 'real-time' computer access. The pricing of options, currency futures and derivative instruments generally is a non-trivial arithmetic exercise which requires appropriate computer software and, again, instant access.

Seemingly less glamorous, but with effects which we shall see later are just as far-reaching, technology has had its effect upon retail consumers. Cash dispensing automated teller machines (ATMs) first appeared in the mid-1970s and have spread rapidly ever since. In the 1980s rival institutions combined their ATMs into networks to give customers even easier access to their accounts. In the 1990s, the same technology was extended to electronic funds transfer (EFT) with the result that stores can provide cash withdrawal facilities. Two processes are at work here. Firstly, the electronic handling of transactions is much cheaper than paper-based transfer, not just in labour but also in its requirement for premises. For years banks defended bank charges and later the non-payment of interest on checkable deposits on the grounds that they needed the endowment effect to subsidize the high cost of the money transmission system. One of the reasons that UK banks have been able to pay interest on sight deposits since 1983 is that the unit cost of payments has fallen.

Another sense in which technology has contributed to cost reduction is through the lowering of the costs of entry into the provision of financial services, making financial markets more **contestable**. Building societies have been able to enter the money transmission business because electronic transfer of funds merely requires an extension to their existing computing capacity where

previously it would have required prohibitive expenditure on labour and premises. The case of retail stores provides an even clearer illustration. Once computer terminals had been installed at checkouts, originally to improve the management of stocks, it required only software modifications, and a secure link to cooperating banking institutions, to enable the same equipment to debit a customer's account for the purchase of goods. Debiting the account for cash was an obvious next step. The cost of entering the cash management part of banking business is now so low for any nationwide organization which has a large number of retail outlets linked to a central computer that it is difficult to see where this development will end. In the opening months of 1997, the hot news in the UK was the competition between major food retailers to provide further banking services, including current accounts with overdraft facilities. In 2004, it was the rapid growth of hedge fund activity in London and the risk that investment banks were taking on in providing services to these funds.

The cost-reducing potential of technology has a number of implications for monetary economics. Firstly, a reduction in transactions costs lowers the costs of intermediation generally. Other things being equal, people will be willing to hold larger simultaneous debit and credit positions leading to a larger money stock and lower velocity than hitherto. Pushing in the opposite direction, as we see in Section 24.3, however, the reduction of transactions costs and the ability to access current balance information more quickly and cheaply may encourage people to hold fewer precautionary balances and to economize on cash holdings in particular, with whatever consequences that may have for the ratio of bank deposits to monetary base.

### 24.3 Three case studies

As we saw in the last section there are many points of contact between policy and innovation. There are times, for example, when monetary policy imposes constraints upon agents within the financial system and upon the end users. Innovations are a rational response to these constraints when the costs of compliance, often affected by the prevailing economic conditions, exceed the cost of innovation, often affected by technological change. Some innovations produce consequences that affect the outcomes of policy makers' plans and raise the question of re-regulation.



Two significant innovations which illustrate this process at work, and also have potentially interesting monetary consequences, are the switch towards ‘off-balance-sheet activities’, including securitization, by banks; and a variety of new products and practices developed by UK banks and building societies as deregulation threw them into direct competition in the 1980s – a package of developments we shall call ‘retail liability management’. A third is the rapid growth of credit risk derivatives. Other examples of innovations, not discussed here but treated elsewhere in this book, are Eurocurrencies (in Chapter 15), Eurobonds and strips (in Chapter 16), futures (Chapter 19) and options and other derivatives (Chapter 20). Readers making a comprehensive study of financial innovation should consult the relevant sections as well as reading what follows here.

### 24.3.1 Off-balance-sheet operations

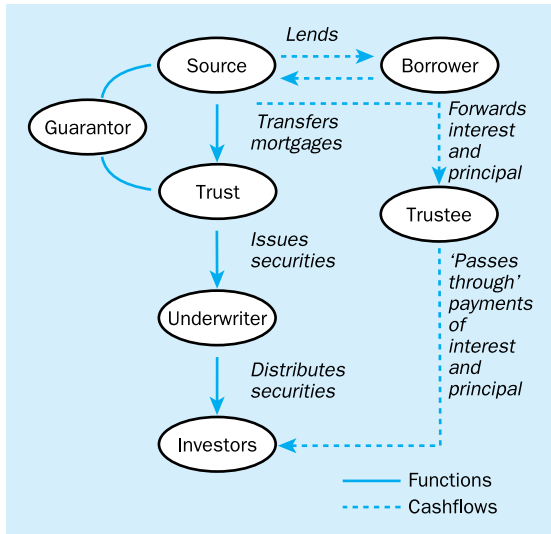
‘Off-balance-sheet’ operations are activities that generate income for banks without creating assets or liabilities which normal accounting procedures would place in their balance sheets. Once again, it is worth noting that there is nothing very remarkable in this. Firms search continually for new services and products to offer to customers. Their success or failure shows in the profit and loss account. We would not expect to see new activities directly reflected in balance sheet changes: the effect on assets and liabilities could be very large or very small. So what is so remarkable about banks engaging increasingly in activities which are only indirectly reflected in balance sheets? The interest that attaches to off-balance-sheet operations by banks stems from a traditional, and rather limited, model of bank behaviour which sees bank income and profit generated more or less exclusively by the maturity and risk transformation that banks carry out specifically by mismatching their assets and liabilities. On this view, an expansion of traditional bank business necessarily requires a corresponding increase in (on-balance-sheet) assets and liabilities.

This still risks an overstatement of the novelty of off-balance-sheet activity, however. One of the earliest functions of UK banks was the guaranteeing or ‘acceptance’ of commercial bills; trustee work, executorships and financial advice generally, also have a long tradition. As with most other innovations, the interest in off-balance-sheet operations lies not in

their novelty but in their recent rapid expansion and increasing variety. A survey by Lewis (1988) listed some 60 off-balance-sheet activities. These were divided roughly equally between ‘financial services’ and those giving rise to ‘contingent claims’. The former included activities such as tax and financial planning, investment advice, portfolio management, insurance broking, credit/debit card services and (most recently) estate agency. The latter included the issuing of guarantees of many kinds, securities underwriting, market making in securities and arranging swap and hedging transactions. One of the themes running through the growth of off-balance-sheet operations, and much discussed in the financial innovation literature, is securitization. This refers both to the increasing use by ultimate lenders and borrowers of capital markets, in preference to bank intermediation, and to the practice by banks themselves of selling off loans from their asset portfolio, by turning them into marketable securities – shifting them off the balance sheet.

The securitization of bank loans has developed furthest in the USA where there is a highly developed market for *mortgage-backed securities*. The tradition of mortgage lenders transferring the original loan to a second investor has its origin in the 1930s when the Federal Government began offering insurance for mortgages made to certain disadvantaged social groups. Because the mortgages were guaranteed, investors were prepared to take them over from the originator. However, the development of an active secondary market in securities dates from the 1970s when the Federal Government reorganized the Federal National Mortgage Association (FNMA or ‘Fannie Mae’) and established two new agencies – the Government National Mortgage Association (GNMA or ‘Ginnie Mae’) and the Federal Home Loan Mortgage Corporation (FHMLC or ‘Freddie Mac’). Their purpose was to issue securities backed by both insured and uninsured mortgages. The basic security is the **passthrough**. The agency puts together a pool of mortgages and sells *shares* in the pool to investors who earn a corresponding share of the payments (of interest and principal) made by the borrowers. The principle of the passthrough, although it originated in the securitization of mortgages, is now a commonly adopted securitization technique and is therefore worth considering in a little detail. Figure 24.1 illustrates the steps.

The source of the loan is any financial intermediary, say a bank or savings and loan, which makes secured loans. In the short run, until sufficient new loans have



**Figure 24.1** The securitization process

been created to justify pooling, the loans stay on the intermediary's balance sheet. At intervals, however, a collection of loans is pooled and placed with a trust, administered by a trustee. The trust issues securities which are then passed to an underwriter who distributes them to the general public in the normal way. The proceeds of the sale return to the source of the loan. If, as we have assumed, the source is a private commercial organization it may purchase a guarantee for the loans which naturally enhances the attractiveness of the ultimate securities. (When the source is one of the government agencies this step will be omitted.) Throughout the life of the loan the borrower makes payment to the originator of the loan in the usual way and the intermediary passes the income to the trustee. The trustee deducts its own expenses and those of the original lender (in continuing to collect and monitor the payments) and distributes ('passes through') the income to the investors.

We have described the passthrough as a share. This is because it has many of the characteristics of an ordinary company share. In particular, the income associated with it may fluctuate as a result of **pre-payment**. This arises when borrowers choose to repay the loan before its scheduled terminal date. This has the effect of boosting investors' income now but lowering it for the remaining life of the security. For the lender, the attractiveness of securitization has always been greatest for fixed rate loans (as US mortgages usually are) since such loans are subject to interest rate risk – the

lender suffering when interest rates rise. Securitization has the advantage for the lender that the interest rate risk is moved to the holders of the securities. Recall that borrowers are paying a fixed rate of interest. When interest rates fall, it becomes attractive to prepay the loan and to replace it with another loan at the new, lower, fixed rate. If this happens on a sufficiently large scale, the holders of the security find that they receive all their income early and then face reinvestment risk – the risk that they will not be able to reinvest their funds for the period that they originally intended at the original rate of return.

Reinvestment risk is a particular problem for life assurance and pension funds for whom security of long-term interest is essential (see Section 21.3). For these institutions, passthroughs are less attractive than bonds which offer a fixed return for a fixed period. Where the loan-backed security takes the form of a bond, however, the prepayment risk remains with the trustee (and thus with the originator of the loan). For this reason, the yield on passthroughs is usually greater than the yield on bonds.

Clearly, at an institutional level, one can view this growth of off-balance-sheet activities as representing a significant change in banking operations. On a more theoretical level, however, one should take seriously the argument that off-balance-sheet activities are essentially the same as the 'traditional on-balance sheet lending and borrowing operations of banks [which] can be seen to be packages of information and risk-sharing (or insurance) services' (Lewis, 1988, p. 396). By taking a customer's deposit a bank (traditionally) creates a very secure, very liquid asset, repayable at par, and turns it into a long-term liability for a borrower. The bank protects both from risk by its superior information and by its size. The interest rate 'spread' is the price that lenders and borrowers pay for this service. Nothing is fundamentally different when a bank accepts a bill or issues a standby letter of credit. The holder of the bill (or letter) enjoys a transfer of risk to the bank for which s/he pays by accepting a lower interest rate on the loan than would have been the case without the bank's guarantee; the borrower pays a fee to the bank for the benefit of the lower interest charge required by the market. Furthermore, the bank is willing to accept the risk in the guarantee because it has information which enables it to make a reasonable assessment of the individual default risk and to price it bearing in mind the average default rate on the total pool of guarantees.

When it comes to identifying the consequences, actual and potential, of the expansion of off-balance-sheet activity, one can say, as with the growth of Euromarkets, that by supplying services that customers want, banks are helping to mobilize funds which might otherwise have lain idle and are generally adding to the liquidity of the financial system. Similar implications can be traced in the case of off-balance-sheet activity. In the last section, for example, we observed that one consequence of the ‘corset’, which penalized the growth of interest-bearing deposits in the UK in the 1970s (and thus reduced the attractiveness of lending), was the ‘bill-leak’. Banks found it more profitable to accept commercial bills issued by their clients. Corporate borrowers were thus still able to borrow, on terms very close to those that would have prevailed on a bank loan. Spending, presumably, grew at much the same rate that it would have done without the corset, thwarting the authorities’ intentions and at the same time removing whatever useful information may until then have been contained in the growth rates of the monetary aggregates. The growth of off-balance-sheet operations, just like the growth of Eurocurrency business, widens the scope for disintermediation to follow as a response to any form of monetary control that targets banks’ balance sheets.

Other possible consequences of concern to the authorities involve questions of efficiency and stability. Firstly, there is a question of *moral hazard*. This arises from the regulatory authorities in most countries being also the lender of last resort. It may be, for example, that banks’ willingness to offer guarantees of various kinds relies itself upon the banks’ knowledge that they have access to liquidity support services offered by central banks and, furthermore, that guaranteed access to this support might encourage more reckless excursions into new activities than would otherwise be the case. For reasons of efficiency, regulators wish to see that banks are not operating with unfair advantage. They wish to see equal opportunities available to all market participants and not just to banks enjoying access to lender of last resort facilities.

Moral hazard arises also from the widespread availability of deposit and other forms of customer insurance in developed financial systems. Indeed, one of the arguments sometimes advanced for the specific off-balance-sheet innovations is the **moral hazard hypothesis** – banks know that their customers are protected and are thus encouraged to take greater risks. This is often combined with the **regulatory tax**

**hypothesis** that argues that off-balance-sheet activity develops specifically to avoid capital, reserve and other regulatory requirements designed to make the system stable. Viewed from this perspective, the regulators’ main concern is to control banks’ exposure to risks which banks have been encouraged to take on as a result of earlier actions by the regulators themselves.

Clearly, off-balance-sheet activity exposes banks to many types of risk (as does on-balance-sheet business). Most of the regulators’ attention has focused upon credit or default risk which banks incur mainly through guarantees and acceptances. The approach has been to try to incorporate off-balance-sheet commitments as part of total assets in calculating a ratio of capital to (risk-adjusted) assets. The details are discussed in Chapter 25.

The growth of Euromarkets and off-balance-sheet activity both owe something to the constraints imposed on traditional banking business by regulation. We turn now to a group of developments where interest lies rather more in their effect on the operation of monetary policy.

### 24.3.2 Retail liability management

To the consumer of financial services in the UK, one of the most visually obvious features of the 1980s has been the diversification of financial institutions and the breakdown of traditional demarcations. Retail banks have become mortgage lenders, market makers in securities, unit trust companies, insurance agents and, with a sense of timing paralleled only by their judgement of the merits of Third World lending, estate agents. Building societies have become banks (virtually in most cases, literally in some). They too have taken on insurance and estate agency and the provision of legal services. *Within* banking, traditional divisions have become blurred as retail banks join others in raising funds in wholesale markets and moving away from their traditional function of ‘direct’ lending, to advising commercial clients on a wide range of financial matters, offering acceptances and guarantees and other off-balance-sheet facilities as we noted above.

A further breach of traditional demarcations has developed with major stores establishing their own financial subsidiaries, firstly to market credit accounts to the store’s customers and later to offer interest on positive balances on credit accounts which involved

regular customer payments. In 1988 Marks and Spencer launched its own unit trust, and selected branches of Tesco began to provide cash withdrawal facilities at checkouts in the 1990s.

Looking at developments from the point of view of the retail consumer, the first and potentially the most far-reaching development of the 1980s was the entry of banks into the mortgage market in 1981. From this stemmed the break-up of the building societies' interest rate cartel in 1983, the rise in building society deposit and advances rates to market clearing levels and the consequent demise of mortgage rationing. As building societies moved onto the offensive, they dabbled in money transmission services by issuing chequebooks (of limited attraction without the benefit of cheque guarantee cards) and set about lobbying the government for a change in the Building Societies Act, 1962, which limited their sources of funds to retail deposits on which interest had to be paid net of tax and restricted their lending to first mortgages secured on property.

Pushing on an open door where deregulation was concerned, the societies were quickly rewarded with the **Building Societies Act, 1986**, which broadened both the sources and destinations of societies' funds. In particular, large societies were permitted a limited amount of unsecured personal lending. This apparently minor change had momentous results. Since societies could now legally permit customers to be overdrawn, they could, for the first time, issue cheque guarantee cards. This made building society cheque accounts indistinguishable from those of banks except for the considerable advantages that societies paid interest on all positive balances, stayed open longer and were generally seen as more user-friendly by the public. The change in building society regulation, therefore, ensured that banks which had, since 1983, grudgingly paid interest on selected cheque accounts with restricted use, would have to follow. The first announcement came from Lloyds Bank in December 1988. The increasing tendency to pay interest on sight deposits has a number of possible consequences. If it narrows the spread between lending and deposit rates, it is one way by which the cost of bank intermediation may fall. Borrowing to finance spending becomes cheaper relative to using existing liquid assets; at the same time, money's own rate increases relative to other assets. In short, money and bank debt both become more attractive. We look briefly at the implications for the demand for money in the next section.

The willingness to hold higher levels of bank (and building society) debt relative both to income and to other liquid assets and liabilities was quite likely further encouraged by a reduction in the **non-pecuniary costs of borrowing** for many people. The unsecured personal bank loan (as opposed to overdraft) is a product strictly of the 1970s when it became available to established bank customers in exchange for the prior completion of an application form requesting extensive personal information. In the 1980s the forms got shorter and the development of credit-rating agencies using computer data files removed the delay. What once involved an interview with a bank manager became available on demand from high street stores. Furthermore, a combination of advertising, unsolicited postal offers of credit and unrequested increases in established credit limits not only made borrowing easier, but transformed its image. The stigma of 'debt' was eventually replaced by the status of 'credit'.

Furthermore, the increasing tendency to pay interest at rates that move with the general level of market rates made it increasingly difficult to engineer changes in **relative rates** for monetary control purposes. The cheapening of bank and building society debt and the loss of control over interest relativities are both related to the general issue of monetary control, an issue to which we turn in a moment.

### 24.3.3 Credit risk derivatives

A major area of growth in recent years has been the market for credit risk derivatives. A credit risk derivative can be defined as:

a contract which allows one party (the protection buyer or risk seller) to transfer the credit risk of a reference asset to one or more other parties (the protection seller or risk buyer) without transferring the reference asset.

The protection that is being bought is similar to the protection that one could get from an insurance contract or a guarantee. Earlier in this chapter we referred to the 'bill-leak' whereby a third party with exceptionally high credit standing (a bank) sold a guarantee of creditworthiness in order to make a market in commercial bills between firms wanting credit and lenders unwilling to take on the whole of the risk. From the protection buyer's point of view, a credit derivative

**Box 24.1 A sample of credit risk derivatives****Credit default swap**

A credit default swap offers protection to a lender in the event of default by a specific borrower.

**Total return swap**

A total return swap exchanges the cashflow from a named asset (interest + capital gain/loss) for a pre-determined rate of interest (usually a spread over LIBOR). In this case the pre-determined rate of interest gives the protection buyer a guaranteed income while the seller receives an uncertain income which will be affected by any credit event.

**Credit spread swap**

The holder of an asset paying a variable interest rate is anxious to protect his or her cashflow relative to the return on some other asset. This may be a risk-free asset or some other benchmark asset (e.g. LIBOR). The protection seller offers to pay a rate of interest which will vary so as to deliver this spread, in exchange for the actual spread earned by the reference asset. The seller gains if the spread widens and loses if it narrows.

**Basket swaps**

A basket swap is like a credit default swap except that 'the basket' contains a number of reference assets. The derivative is normally triggered by the first asset in the basket to default.

achieves much the same result. But these derivatives do so with much more flexibility. This is because the derivative can in principle be based on *any* underlying asset (the 'reference' asset) while traditional forms of guarantee were linked to a very narrow range and also because they can be designed to compensate for the risk inherent in a wide range of activities, rather than the classic case of default. Furthermore, credit risk derivatives differ from the 'standard' insurance contract in that they offer a known level of compensation, provided only that the 'defined credit event' occurs. This compensation is assured, regardless of the actual loss the protection buyer may suffer. Unlike an insurance contract, therefore, where the insured is compensated only for the loss actually experienced (which is unknown at the time of the contract) the derivative has a known value and this is essential if it is to be traded. In short, they open up a market in protection against 'credit events' which offers a flexible hedge against adverse events to protection buyers and new investment opportunities to protection sellers.

There is some dispute about when the market for credit risk derivatives began, but the US financial press in 1993 was making reference to deals done by Merrill Lynch and J P Morgan. By 1996 the market was expanding rapidly. In 2002 the British Bankers' Association was estimating the size of the market at US\$2 trillion with the prospect of doubling again by 2004.

Credit risk derivatives come in many shapes and sizes. Box 24.1 summarizes the main types. In the illustration that follows we look at the details of one of the commonest types – the single name credit default swap (CDS).

To begin with, we imagine two banks, A and B. Over the years, each has developed specialist knowledge about certain types of lender and has a portfolio of loans which is concentrated in this area of expertise. Let us suppose that Bank A has many clients from the leisure and entertainment industries while Bank B has a majority of its loans with the retailing and distribution sector. Both banks are exploiting their superior knowledge of screening and monitoring, and perhaps also some economies of scale, but we know from Chapter 2 that they are forgoing at least some of the benefits of diversification by holding these specialized portfolios. One solution would obviously be for each bank to develop its lending to other sectors but this might be inefficient if it means going into markets with which it is unfamiliar. (Instead of reducing risk, it might even increase it.) An alternative is for each bank to enter into an agreement to 'buy' part of the risk of the other bank's portfolio, without transferring any part of the portfolio or reducing portfolio concentration. In exchange for a fee from Bank A, Bank B agrees to pay (a fixed amount of) compensation if a defined event occurs, and vice versa. Figure 24.2 shows the process we have just described. What we have

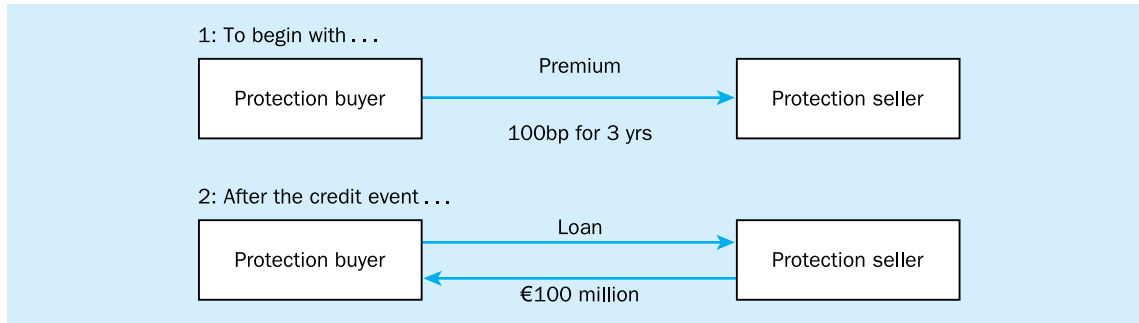


Figure 24.2 A single name credit default swap

described is a bilateral deal, but in principle there is no reason why shares in the risks of these portfolios should not be bought and sold between third parties.

In Figure 24.2, a bank buys protection for a €100m loan for three years by issuing a single name CDS to an investor. For this benefit, the bank agrees to pay 1 per cent interest (100bp) per annum. In the event of default by the borrower, the seller of protection agrees to pay €100m. In this particular deal, the buyer agrees to transfer the loan (and whatever residual value it may have) to the seller. This is a very simple deal and the possibilities of variation are considerable. The term and the principal can take any value. The premium can be fixed, as here, or it can be fixed relative to some benchmark such as LIBOR. The contract can specify that the underlying asset must be transferred (as here), in which case the seller of the protection will be entitled to whatever value can be recovered, or the asset may remain with the buyer of protection. Box 24.2 lists the key terms which each contract must specify.

The pricing of credit risk derivatives is beyond the scope of this book. A text like Jarrow and Turnbull (1999, Ch. 18) will supply the deficiency and some guidance can be obtained from the sources referred to in 'More from the web: Credit risk derivatives'. But a glance at the example in Figure 24.2 will help explain the variables that will be relevant to the pricing. First of all, we note that the seller of protection is earning a premium of 1 per cent. Given the size of the loan being protected, this will produce a cashflow of €1m for each of three years. If we wish to put a *price* on this contract then a present value can be found for this in the normal way. The more interesting question concerns the variables which generate the premium of 100bp. Recall that the buyer is insuring a loan on which it is charging a given rate of interest consisting

of the risk-free rate plus a risk premium, both of which are market-determined. The buyer is then, in effect, using a slice of that premium to buy protection. Why is the seller prepared to settle for a price which may be less than (and certainly will not be more than) the market risk premium on loans of this kind? Firstly, we need to remember the basic point that the seller is receiving a fee only for the *protection*. Unlike the seller, it is not funding the loan. The whole point of credit risk derivatives, we saw at the beginning of this section, was to separate the risk in an asset from the principal of the loan. That said, it may still be that the seller is charging a premium which is less than the risk premium charged by the lender. But this merely reflects the portfolio preferences of the protection seller and in particular the preferences towards this particular risk. It may be, for example, that the protection seller is looking for exposure to the type of risk on offer because s/he has little exposure to this sector and thinks that the sector has a low covariance with other sectors to which it has considerable exposure. This is the case that we saw with the two banks at the beginning of this section. While Bank A would require a substantial risk premium to induce it to lend any more to clients in the entertainment field, Bank B is happy to accept some risk exposure in this field at a lower cost because it helps diversify its portfolio.

When it comes to deciding exactly what to charge for this protection one obvious variable will be the risk of default. Another will be the prospects of recovering any value in the case of a credit event triggering the compensation and there will also be the seller's own costs of operation to consider. This last point is often put in terms of the seller's cost of capital, partly on the grounds that the cost of capital is a major cost for any firm. But given the Basle capital adequacy directives,

**Box 24.2 Elements of a credit risk derivatives contract**

The key terms which must be agreed in any credit risk derivative contract include:

**The underlying or reference asset(s)**

The asset can be any credit asset. Bonds and loans are the most common. In a basket swap, all the component assets must be specified.

**The credit event**

This could be the default on a payment; insolvency; deterioration in credit-rating; change in a credit spread; restructuring of a business. The terms must be precisely specified, e.g. as to whether there is any grace period in respect of payments in default, or the threshold below which the credit rating must not fall.

**‘Materialization’**

This is related to the credit event in that ‘materiality’ clauses endeavour to specify incontrovertible criteria for judging that the credit event has actually occurred.

**Payment terms**

These are the payments made by the buyer of protection and are usually periodic over the life of the contract. They may be specified as a percentage of the value of the underlying asset or they may be specified as a margin over some benchmark, variable, interest rate. Frequency and date of payment must also be agreed.

**Payment in case of a credit event**

Clearly there needs to be agreement as to the compensation paid in the case where a credit event triggers the contract. This will involve the fixed sum being paid by the protection seller but it will need to state whether the seller receives the underlying asset. Some credit spread swaps are triggered only if the spread narrows beyond a certain point. This could happen at any time in the contract and so the contract must include a means of arriving at a value for the compensation to be paid having regard to the remaining length of the contract.

**More from the web  
Credit risk derivatives**

Because of their recent development, but more especially because of the very rapid growth in the market for credit risk derivatives, websites are at least as useful as published textbooks. Two websites which provide an explanation of credit risk derivatives and how they work are:

[www.credit-deriv.com/creprime.htm](http://www.credit-deriv.com/creprime.htm)

[www.finpipe.com/crederiv.htm](http://www.finpipe.com/crederiv.htm)

Both sites have useful links to other sources.

Because of the centrality of risk, central banks are inevitably interested in the growth of this market and two useful articles have appeared in publications from the Bank of England and the Bank of Canada.

These can be downloaded from:

[www.bankofengland.co.uk/fsr/fsr10art3.pdf](http://www.bankofengland.co.uk/fsr/fsr10art3.pdf)

[www.bankofcanada.ca/publications/review/005-ea.pdf](http://www.bankofcanada.ca/publications/review/005-ea.pdf)

One thing is for sure, typing ‘credit risk derivatives’ in any web browser will produce an overwhelming response.

it is quite likely that a bank buying risk will have to set aside a certain amount of capital in order to stay within the rules.

**24.4 The demand for money and monetary policy**

In the early chapters of this book we repeatedly stressed that the successful conduct of monetary policy, especially where that policy includes targeting monetary growth rates, relies heavily upon a stable demand for money function. An obvious comment to make about financial innovation, therefore, is that it must surely make it more difficult to operate monetary policy and in particular to operate any monetary policy, such as following a money growth rule, which relies upon a stable demand for money function (see Chapter 13). In this section we explore numerous ways in which changes in the financial system can lead to changes in the demand for money. We begin by suggesting a

number of ways in which one could imagine this happening in principle. The purpose of this is to emphasize the large number of channels through which institutional changes might work and the difficulty of judging *a priori* which of several contradictory results a given innovation is likely to have. Even so, our list is not exhaustive. Towards the end of the section, we make brief reference to recent empirical work on the demand for money which has tried to identify and incorporate the impact of one or more aspects of financial innovation.

**Interest rates.** As we saw in Chapter 13, which rate of interest should be chosen to represent the opportunity cost of holding money has been a perennial problem. What is and what is not a close substitute for money changes over time. Furthermore, the ‘closeness’ of substitutes varies with the definition of money, something which itself varies as innovations in very liquid assets take place. In a study of UK households’ demand for money, for example, one might have taken some measure of building society share and deposit rates up until 1989 when M3 (which excluded building society deposits) was replaced by M4 (which included them). Even with a constant definition of money, however, the closest substitutes will change through time. Taking the 1980s again, it would be interesting to know whether the aggressive marketing of National Savings instruments, including new products paying more closely market-related interest rates, made NS rates more relevant than, say, bond rates. For firms, the development of the CD and the interbank market from the end of the 1960s explains the appearance of those rates of interest in money demand studies. The Eurocurrency markets offer a new, possibly relevant, set of rates. Furthermore, while theoretical considerations may dictate the relevance of, say, long rather than short rates the appropriate choice in practice requires knowledge of institutional detail. In this case the obvious choice might seem to be the rate on long-dated gilts, and this would be correct in a financial system where secondary trading was thin and costly and where securities were generally held to maturity. The growth and development of the secondary gilts market, however, and the changes especially since ‘Big Bang’ have made all gilts extremely liquid. As we noted in Chapter 17, long gilts like shorts can be sold cheaply and easily for cash in 24 hours.

Whether or not absolute changes in the rate(s) on non-money assets represent changes in the opportunity

cost of money depends, of course, on what is happening to money’s ‘own rate’. In a world where bank deposits do not pay interest, money’s explicit own rate is zero and absolute changes in rates on non-money assets necessarily indicate changes in opportunity cost. An intermediate situation applies where deposits pay interest but at rates which are probably low but above all are very sticky. This was a situation which prevailed in the UK until the changes in *Competition and Credit Control* in 1971. Once deposits begin to pay market-related rates then changes in money’s own rate mean that it is changes in the ‘spread’ or differential between the rate on money and the rate on other assets that indicate a change in opportunity cost. Furthermore, where some deposits (and notes and coin) still pay no interest and where banks offer premium rates for differing terms and conditions, theory suggests that money’s own rate should be indicated by a weighted average of deposit rates.

In theory at least, the spread between money’s own rate and the rate charged on bank lending should also influence the demand for money since spending in excess of income can be financed either by running down liquid assets or by borrowing. It has been pointed out by Goodhart (1984) that when the rate on overdrafts and the rate on deposits are equal, the demand for overdrafts will become infinite. The significance of this observation is widely recognized in studies of the demand for bank lending. It is less frequently recognized that there is also an implication for the demand for money since the attraction of overdrafts when this spread approaches zero arises from a reluctance to run down liquid assets. Clearly, the growth of interest-bearing deposits and the resulting changes in money’s own rate is involved here as well. Furthermore, financial innovation may be implicated in changes in the other part of the spread, the cost of bank lending. As we shall see in the next section, competition between banks and building societies to lend for house purchase in the 1980s led households in the UK to build up their holdings of floating rate debt. This altered dramatically the composition of their bank debt as the share made up of personal loans and overdrafts diminished while the share of mortgage debt rose. Until the fall in property prices began in 1990, mortgage lending was charged at rates very close to base rates with the result that at any given level of interest rates the average cost of bank debt, weighted by its components, was falling. The attractiveness of borrowing from banks while building up liquid assets



was possibly further reinforced by the increasing ease with which bank credit became obtainable – a decline in the non-pecuniary costs of borrowing. Again, the next section details the rise in personal sector indebtedness and its consequences; it should be remembered that this was the counterpart to a steady rise in the demand for money relative to income and to the dramatic decline in income velocity.

**Velocity and the scale variable.** As we noted in Chapter 13, when economists today refer to velocity, they are almost always referring to **income velocity**, that is to say  $GDP/M$ , or  $PY/M$  – in contrast to Irving Fisher’s use of **transactions velocity**,  $PT/M$ . The most commonly expressed reason for this seems to be that since we are ultimately concerned with money’s influence on *output* (or the price of output),  $PY$  is more relevant than  $PT$ . As we shall see shortly, this runs the risk of ignoring links that may run in the other direction – from spending to money.

Limiting our discussion to income velocity for the moment, it is clear that velocity can change in any direction, depending on the precise form that innovations take. The more traditional view, which associates innovation with the development of near-money substitutes, would lead us to expect a fall in the demand for money relative to  $GDP$ . As the need for asset balances declines, the existing money stock is able to finance more (income) transactions. On this view, innovation is associated with rising velocity. On the other hand, and this is a compelling argument given developments in the UK in the 1980s, if innovation leads to the development of increasingly close money substitutes that bear interest, then this may be followed by a rise in money’s own rate relative to other rates which *increases* its attraction as a liquid asset. This is simply restating the earlier interest rate argument in velocity rather than demand terms.

There may, however, be much more subtle connections between innovation and velocity which we can explore only if we go back to the idea of transactions velocity,  $PT/M$ . Total transactions are larger than ‘income’ transactions by an amount which reflects, *inter alia*, the volume of intermediate transactions involved in the production process (itself a reflection of the degree of integration in production), the volume of financial transactions and the volume of transactions in existing assets or ‘secondhand goods’. The latter of course includes a very large proportion of total house sales/purchases. In adopting  $PY$  rather

than  $PT$  the point is often made that total transactions are likely to be stably related to income transactions and that the distinction between the two is, therefore, unlikely to matter. This is certainly convenient, but not very compelling. Clearly Fisher (1926) did not think it probable and Keynes (1930) explicitly denied its likelihood in the first volume of the *Treatise*. Various attempts have been made in recent years to develop a  $PT$  series and to compare its movements with  $PY$  or  $GDP$ . Following Keynes and using cheque and electronic payments data, Bain and Howells (1991) constructed a  $PT$  series which showed a dramatic upward divergence from  $GDP$ , from a multiple of approximately two to three between 1979 and 1989. Interestingly, this study deliberately omitted all transactions through the CHAPS and ‘Town Clearing’ systems. These are ‘same day’ payments mechanisms used predominantly by financial firms but also in the settlement of housing transactions. Including CHAPS and Town Clearing data not only makes the  $PT/PY$  multiple much larger but also increases dramatically the divergence over time. It seems at least worth considering the possibility, therefore, that financial innovation could have a fairly direct effect upon *transactions* velocity by causing a rise in financial and ‘secondhand’ transactions relative to those involving newly produced goods and services. Howells and Hussein (1997) found that the demand for UK broad money is much better explained by  $PT$ , represented by the Bain/Howells series, than by  $PY$ , where  $PY$  includes only  $GDP$  transactions.

This distinction between income and transactions velocities, and the possibility that financial innovation may somehow be implicated, raises another interesting possibility although it is more strictly related to supply and only indirectly to the demand for money. The endogeneity argument, as we saw in Chapter 13, is based upon (deposit-creating) advances being demand-determined. The demand for bank lending originates ultimately from the expenditure needs of deficit units. The desire to spend in excess of one’s income can reflect a desire for newly produced goods or services or for financial assets or for secondhand goods. There seems no good reason, therefore, why  $GDP$  rather than  $PT$  should appear in bank lending equations. Indeed, theory suggests the reverse. Suppose now that the demand for bank lending were shown to be sensitive to  $PT$  rather than to  $GDP$ . Bank lending follows total transactions and grows more rapidly than if it were closely linked to  $GDP$ . Bank lending and the money

supply grow more rapidly than income and income velocity must fall. Financial activity thus not only affects transactions velocity but is causally implicated in the fall in income velocity. Of course, in equilibrium, the resulting deposits must be held. It would be interesting to see the effect of using a *PT* series as the scale variable in demand for money studies.

**Transactions costs.** Since Baumol (1952) and Tobin (1956) brought inventory-theoretic considerations to bear upon transactions demand it has been recognized that brokerage charges (for changing bonds into money), or the 'shoe leather cost' of going to the bank to change deposits into cash or non-money assets into deposits, should play some part in determining the quantity of money people wish to hold and the form in which they wish to hold it.

Such charges, explicit and implicit, are amongst the costs most likely to be reduced by technological innovation in the banking and payments systems. Firstly, we should note that electronic communication and ATMs lower the cost of entry into some areas of banking activity. Where competition increases we should expect a narrowing of spreads and a desire to hold both larger deposits and larger debts than hitherto. More specifically, where extensive (and expensive) specialist labour and premises would previously have been required, cash deposit and withdrawal facilities can now be offered by retail stores whose computer networks already allowed for payment by credit and debit cards. Three obvious consequences could follow from this. Firstly, there is an opportunity to economize on non-interest-bearing cash and an increased desire to hold deposits, giving banks command over a greater proportion of monetary base. Secondly, the virtual automatic access to credit lines provided by plastic cards raises the theoretical question of whether this unused credit should be included in a 'truer' measure of money and at the same time reinforces the point we made above that easier credit makes it more attractive to hold both debit and credit positions simultaneously. On the other hand, ATMs, which typically offer current balance statements and more especially on-screen home banking services, could reduce considerably the need for significant holdings of precautionary balances by making it easier for people to manage their money balances with precision.

Predictably, attempts to incorporate the effects of financial innovation in empirical work have been most marked with respect to interest rates and a recognition

that variations in money's own rate, where the demand for broad money is at issue, could be significant. The own rate can be entered implicitly as an element in the differential between money's own rate and the rate on other assets or explicitly with the rate on other assets appearing independently. Adam (1991), for example, estimated long- and short-run equations from quarterly data for UK real M3 1975–86 using a weighted average own rate on money, with the weights and interest rates reflecting each of the components of M3. Other, opportunity cost, interest rates were the yield on bonds (including capital gains) and on Eurodollar deposits (adjusted for expected depreciation of sterling), recognizing thus the 'innovations' of Euromarkets and the abolition of exchange controls. Both money's own rate and the rate on foreign assets were significant in the long-run equation.

In Chapter 13 we noted that empirical work on the demand for money had employed a variety of scale variables in an attempt to capture the effect of, variously, income, wealth or transactions. This variety is driven more from the controversies which still surround the motives for holding money, however, than by a recognition that financial innovation has changed the appropriate variable. If, as we have said several times, the boom in financial activity in recent years has caused non-income transactions to rise as a proportion of total transactions then it would be interesting to see the effect of using a *PT* rather than *PY* series as the scale variable. A recent comparison of the demand for broad money in the UK and Germany (Biefang-Frisancho Mariscal *et al.*, 1995) found the coefficient on real GNP for Germany was close to unity, while for the UK it was nearly 1.7. The latter is what one would expect if the demand for money were following a *PT* series which was growing more rapidly than GNP. It may not be coincidence that *PT* has diverged from *PY* in the UK since the mid-1970s while it has not done so in Germany.

Most explicit attempts to include the effects of institutional change on the demand for money have focused upon long-run changes, rather in the spirit of the quantity theory that while velocity may change it does so only in the long run and as the result of institutional factors. Institutionally related variables used in studies have included bank offices per head of population, the proportion of the labour force employed outside of agriculture, and the ratio of currency to total money stock and of non-bank to bank financial assets. Other efforts have involved the inclusion of

past peak levels of interest rates on the grounds that the incentive to innovation, as we saw in Section 24.2, comes from changes in costs of which interest rates are an important part. The argument is then that an innovation, once adopted, is not usually reversed even when interest rates fall. Clearly, however difficult it may be to measure the effects empirically, the scope for financial innovations to modify the demand for money, in various contradictory ways, are considerable. Consider the following:

- liability management affects money's own rate and thus the opportunity cost of holding money;
- a change in financial transactions relative to GNP transactions may make GNP an inappropriate scale variable;
- a reduction in transactions costs may reduce the demand for precautionary balances but may also lead to more borrowing and larger debit and credit positions;
- by creating ever closer money substitutes, innovation may lead to an increase in velocity;
- cheaper access to cash may reduce the demand for cash and thus reduce  $\alpha$ , the public's cash ratio, with implications also for money supply;
- better access to balance sheet information may reduce the demand for precautionary balances;
- better access to financial innovation generally may make agents more sensitive to interest rate differentials leading to more frequent switching between components of broad money.

From this, one can theorize *a priori* virtually any effect one chooses upon the demand for money. Figure 24.3 shows five money demand curves. The rate of interest is an absolute rate on alternative assets and money is assumed (for the moment) not to pay interest. Let  $M_d^0$  be the 'original' curve. Consider firstly the possible effects of liability management where this results most notably in money starting to pay market-related interest rates. If the demand curve in Figure 24.3 shows the demand for broad money, then the increasing practice of liability management, leading to an increase in the proportion of money that pays interest, shifts the curve outward from  $M_d^0$  to  $M_d^1$ . More money is demanded at any rate of interest. If, however, the figure depicts the demand for narrow money, while liability management results in interest being paid only on the components of the broader aggregates,

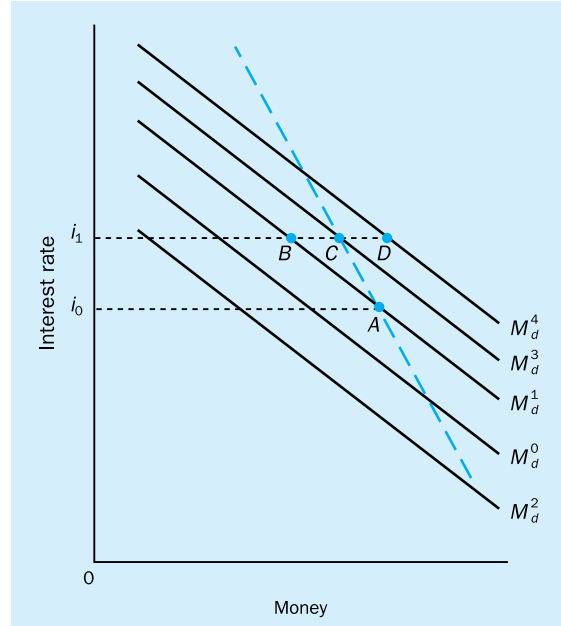


Figure 24.3 Financial innovation and the money demand curve

then  $M_d^0$  will shift to the left, to  $M_d^2$ . Similar effects follow from any of the innovations which lead to an economizing on money holdings.

Now consider the effect of a rise in interest rates. We start on curve  $M_d^1$ . When money does not pay interest, a rise in the general level of interest rates from  $i_0$  to  $i_1$  moves us up  $M_d^1$  in the normal way. When money's own rate is market-related, however, the rise in interest rates on non-money assets is accompanied by a rise in money's own rate and the demand curve *shifts out*, reflecting the increase or improvement in money's 'services'. In Figure 24.3, the demand curve shifts to  $M_d^3$  and the quantity of money demanded is reduced from A to C rather than to B. If we plot the change in quantity against the change in price, we trace out the false demand curve shown by the long-dashed line. It is this that presumably leads to the oft-made but strictly incorrect assertion that liability management makes the demand for money less interest elastic. If we were to redraw Figure 24.3 with the genuine opportunity cost under liability management, that is, the bond rate minus own rate *spread*, on the vertical axis then the confusion is clearly exposed. Liability management delivers a smaller change in the spread and so we move a smaller distance along a

given demand curve. In the case where money's own rate moved perfectly with the bond rate, there would be no change at all in the spread and we would stay at one point on the curve. In Figure 24.3 as drawn with a simple, absolute, rate on the vertical axis, this would be shown by a rightward shift of the curve to  $M_d^+$ , sufficient to offset completely the movement up it A to D.

Remember that in Chapter 13, where we discussed the history of monetary targeting and techniques of monetary control, we saw that the rationale for monetary targets is a stable relationship between money growth rates and the rate of growth of spending – a stable velocity. Furthermore, we noted that the main instrument that central banks have at their disposal for influencing monetary growth is changes in short-term interest rates. Ideally a change in official dealing rates would cause a change in *relative* interest rates. When official rates are increased (for example) the return on non-money assets rises in relation to the return on money. Money becomes less attractive and people hold fewer deposits. The rise in rates also increases the cost of borrowing. The flow of new loans diminishes and the money supply expands more slowly. The reduction in the demand for loans will be further reinforced if the switch from deposits to non-money assets makes it cheaper for firms to borrow by issuing liabilities which are taken up in preference to deposits. But all this begins with, and depends upon, the central bank's ability to change relative rates when it changes its official dealing rates. This becomes increasingly difficult as money pays interest and as the rate that it pays moves in line with changes in other rates. At the same time, sharp changes in the interest-bearing proportion of money, such as that

witnessed in the UK in the 1980s, mean that the average 'own rate' on money changes. When this happens, people hold more (or less) money relative to spending. Velocity is no longer stable.

## 24.5 Summary

Innovation is a natural and continuous process in a competitive economic environment. However, it is stimulated by changes in the economic environment and these changes are more pronounced at some periods than others. Typically relevant changes are those involving regulation, technology and volatility of financial flows. Each of these has played a major role in stimulating groups of financial innovations during the past 30 years.

Examples of financial innovation are scattered throughout this book, but in this chapter we looked at three particular forms of innovation, which are both widespread and significant either for the regulatory authorities or for the conduct of monetary policy. The first of these is the development of off-balance-sheet activity. This originated as a response to regulation but has blossomed – particularly in the form of securitization of loans – as a response to reducing the risk exposure of institutions which make fixed rate loans in periods of volatile interest rates. The second is retail liability management. This began in response to deregulation and has had major impacts on the demand for money and on the ability of the authorities to control monetary growth. The third is the rapid expansion in the use of credit risk derivatives which provide a particular form of insurance against risk.

### Key concepts in this chapter

Regulatory dialectic  
'Competition and Credit Control'  
Financial volatility  
Regulation Q  
Contestable markets  
Off-balance-sheet operations  
Securitization  
Moral hazard hypothesis  
Regulatory tax hypothesis  
Passthrough

Pre-payment  
Retail liability management  
Building Societies Act, 1986  
Non-pecuniary costs  
Relative interest rates  
Credit risk derivatives  
Money's own rate  
Income velocity  
Transactions velocity  
Transactions costs

## Questions and problems

- 1 Why does financial innovation occur?
- 2 Explain, using examples, how regulation, technological change and volatility can encourage financial innovation.
- 3 Why has financial innovation been such a feature of the past 25 years?
- 4 Explain what is meant by 'off-balance-sheet operations' and give three examples.
- 5 Explain the basic principles underlying the creation of loan-backed securities.
- 6 What are the characteristics of a 'passthrough' security? Why might these characteristics limit the attractiveness of this type of security for some types of investor?
- 7 What is meant by 'retail liability management'? Explain how it has been encouraged by deregulation.
- 8 Discuss the impacts, potential and actual, of liability management on the demand for money.
- 9 Why has retail liability management made control of the money supply more difficult?

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## Chapter 25

# The regulation of financial markets

### *What you will learn in this chapter:*

- Why financial systems are heavily regulated
- The nature of market failure in financial markets
- The arguments against regulation based on agency capture, moral hazard and compliance costs
- The arguments for and against self-regulation
- The nature of the problem of competitive laxity
- The problems caused for regulators by globalization and financial innovation
- The difficulties in regulating a financial system composed of separate national systems with different banking traditions

## 25.1 Introduction

The financial services industry has always been politically sensitive and, consequently, heavily regulated. The political sensitivity of the industry stemmed from its origin in money-lending which many religions have equated with usury.<sup>1</sup> The rejection by Christianity of usury up until the early years of the Renaissance led to money-lending being dominated by non-Christian outsiders which, in turn, intensified the distaste for it, even while the services of money-lenders were becoming increasingly demanded. Shakespeare's *The Merchant of Venice* shows a society which accorded moral superiority to the shipping of goods from one country to another over the lending of money even though the former depended on the latter.

There have also been more specific reasons for concern about the practice of the industry. Up until the past quarter of a century or so, the term 'financial services' referred principally to the banking and insurance industries. The specific reasons for the demand for regulation of these two industries have been rather different. For the banking industry, the basic problem has been its reliance on public confidence. The fractional reserve banking system – the holding of only relatively small reserves against deposits – vastly increases the potential profitability of banks but, at the same time, leaves them at risk from loss of public confidence which may cause a run on their deposits. The risk of collapse is made greater by the contrast between the liquid nature of bank liabilities (deposits) and the illiquid nature of their assets (loans). Further, the assets of a bank are likely to have a significantly lower value when the bank is in liquidation than when it is a going concern. Consequently, a collapse will generally result in a heavy loss to creditors.

There are two principal areas of concern in relation to bank collapse. The first is the prospect of *contagion* – the collapse of one bank leading to the collapse of others with the possibility of damage occurring to the whole financial industry. This, in turn, might have very serious consequences for the real economy. Contagion might arise to the extent that a failure of one bank causes a loss of confidence in banking in general. Thus,

a run on a bank may occur because it becomes known that it is in a difficult financial position – perhaps it has made a number of dubious loans that are not likely to be repaid. This could either lead the public to become more discriminating in their choice of bank, in which case there would be no danger for soundly managed banks, or it could lead to many depositors wishing to withdraw their funds from the banking system in general, causing problems for all banks. A second possible source of contagion is the very high level of interbank dealings which is a common feature of modern finance – the collapse of a large bank might create a significant quantity of bad debts for other banks. It is possible as well that the default of a major borrower might encourage other borrowers to default. This was one of the fears in the early years of the international debt crisis of the developing countries which started in 1982 with the decision by Mexico to default on debt repayments.

The second concern with regard to possible bank collapse relates to consumer protection. The efficiency of a modern economy is greatly enhanced by the development of the financial system and thus it is desirable that as many people as possible participate in that system. It follows that collapses of financial institutions within a sophisticated financial system are bound to affect many people, small savers as well as large. Further, most people who take part in financial transactions have very little knowledge of either the products or the processes of the system. In addition, prices in financial markets depend heavily on expectations and can thus move very sharply as a result of market optimism or pessimism. This means that large profits (and losses) can, on occasions, be made with great rapidity. It is hardly surprising, then, that greed, chicanery and gullibility are present to a greater extent in financial markets than in many others. A recent example with grave political and social consequences was the collapse of the pyramid savings schemes in Albania in early 1997.

In markets where the potential losers may be thought to be people with ready access to financial resources and information, it may seem reasonable to follow the principle of *caveat emptor*.<sup>2</sup> It would, however, take a bold politician to ignore the plight of small savers threatened with the loss of their life savings. The safest

<sup>1</sup> It is the strict Islamic rejection of usury that has led to the quite rapid development in recent years of Islamic banking which eschews the taking of interest.

<sup>2</sup> Let the buyer beware.



**Box 25.1 Attitudes towards losers in financial market****1. Lloyd's of London names**

Lloyd's of London is an insurance market organized into 400 syndicates supplying a range of insurance services. Syndicates are backed by 'names' who guarantee to meet any syndicate losses from their personal wealth on a basis of unlimited liability. In profitable years, 'names' do not have to provide funds and thus earn a rate of return on money that can also be invested elsewhere. However, in the late 1980s and early 1990s, several syndicates experienced years of large losses and 'names' backing these syndicates were called upon to pay large sums. It was claimed that some losses were the result of manipulation by professionals in the market and the market felt obliged to provide some compensation to losers in order to try to salvage its own reputation. Many court actions were undertaken by 'names'. Nonetheless, there was very little public sympathy for 'names'. It was widely believed that they were happy to accept the high returns without being prepared fully to accept the accompanying risk.

**2. UK private pensions**

In the late 1980s, new legislation opened up the possibility of people taking out private pension plans. Large insurance companies saw this as a major new market and set about persuading large numbers of people to switch from their existing pension schemes operated by their employers to private pension plans or to take out personal pensions rather than joining employers' schemes. Between April 1988 and June 1994, many people were misled by insurance companies into believing they would be better off with a personal pension plan when the reverse was the case. When this became clear, there was widespread public and political anger. The industry regulators imposed fines on the companies involved and required that compensation be paid. However, the form of compensation was not agreed until some years after the problem became known. The mis-selling review was not completed until early 2003. Compensation offered by the insurance companies was over £11.5bn and fines of more than £10m were levied on the companies. The administration costs of the review were £2bn.

**Losers and the search for remedy**

We have seen in the personal pensions case and shall see again with regard to split investment trusts in Box 25.4 that there is sometimes a case for losers in financial markets to be rescued. On other occasions, as with bank deposit insurance, losers are, up to set limits, insured against loss. In the personal pension example, industry regulators sought recompense for the wronged parties. However, although losers may in some circumstances obtain help from an ombudsman, they mostly must seek legal remedy, as with Lloyds names above and the Mirror Group pensioners considered in Box 25.2. We mentioned another interesting legal case in Section 20.8, with the ratepayers of Hammersmith and Fulham being rescued by the courts from the folly of their council officials. Other cases abound. All these cases raise, in different ways, the question of the extent to which people should be held responsible for their actions in complex financial markets.

response is to attempt to regulate the market in the hope of preventing such situations from occurring and/or to provide insurance where they do arise. Box 25.1 considers some contrasting British cases from this point of view.

Deposit-taking institutions have been subject to heavy regulation because their liabilities form the means of payment. Thus, bank regulation aims to guarantee the integrity of the transactions medium and to prevent the process of financial intermediation from failing.

Special features that explain the high level of regulation of the insurance market include the very

long term of some contracts, the size of many of the risks being insured relative to policyholders' incomes, and the lack of transparency of many of the products. Until quite recently, in other financial markets – for equities, bonds, bills, derivatives – only the funds of professional investors were at risk. Now, however, many people have at least an indirect interest in the performance of such markets through unit trusts, investment trusts and pension funds managed for them by professional fund managers. More of us than ever before have a reason for wishing financial markets to be sound and transparent.

## 25.2 The difficulties of regulation

The case for regulation can be put in more technical terms than we have done above. Regulation is necessary, we could say, because of *market failure*. Market failure might arise for any number of reasons – because of the presence of elements of monopoly or oligopoly; because confidence in the financial system is a social benefit which will not be adequately valued by individuals in the market; because of the lack of perfect knowledge and so on. A particular form of the lack of perfect information is **asymmetric information** – the ignorance of consumers relative to producers in highly technical markets. Although not all the arguments are convincing, there is a firm basis of support for some level and form of regulation of financial markets. We do, however, face a number of difficulties.

Firstly, regulation can cause problems as well as solve them. This has been at the base of the strong demand over the past quarter of a century for **deregulation** – for greater freedom from government control – in all areas of the economy, not least in financial markets. These demands have been supported by the development of the ‘economic theory of regulation’ which stresses a number of undesirable features of regulation. The theory<sup>3</sup> derives from the idea of **agency capture** – that the regulatory process will inevitably be captured by producers and used in their interests rather than in the interests of consumers. The theory of regulation points to four major failings of regulation:

- Regulation creates *moral hazard*. That is, it causes people to behave in a counterproductive way. For example, a belief that the government will ensure the safety of deposits with all financial institutions leads savers to deposit their money without giving thought to the behaviour of the company with whom they bank. This, in turn, allows dubious organizations to survive. Equally, the belief that they will always be rescued from collapse causes financial institutions to take greater risks in their lending policies in search of higher returns. Moral hazard is discussed in Section 24.3.1 in relation to off-balance-sheet activity. A much-quoted example of moral hazard in operation was the risky behaviour of Savings and Loans Associations in the USA in the 1980s (see Box 4.1).

- The regulatory process is likely to be captured by producers since the activities of regulators are much more important to each of the relatively small number of producers than to each of the much larger number of consumers. Further, the next career move of regulators is often into the industry they have been regulating and so they may not wish to offend producers and/or regulators may be ex-practitioners who share the judgements and values of the producers.
- Regulation creates **compliance costs** (the costs of adhering to the regulations) for producers. The effects of such costs depend on the degree of competition in the industry and the nature of the costs. If producers are able to pass the costs on to consumers, the result is higher prices and lower output. On the other hand, fixed compliance costs will have no impact on marginal costs and, in a genuinely competitive industry, will not affect output. Complying with regulations may also have benefits for firms. They might, for example, be required to keep better records than they would have chosen to do voluntarily and might later discover advantages in having done so.
- The need to comply with regulations increases the costs of entry into and exit from markets. This helps to preserve monopoly positions and make cartels more stable.

Combining the last two arguments produces the proposition that regulation inhibits competition and thus reduces the efficiency with which financial markets help to allocate the economy’s scarce resources. However, even if we accept that regulation restricts competition, it is by no means the only factor in financial markets that does so and there is no guarantee that a reduction in regulation will lead to increased competition. The deregulation argument may work in two ways.

- Regulation keeps out new entrants who, if they could enter, would force existing firms in the market to be more efficient and would compete prices down, removing monopoly rents.
- Regulation prevents mergers and acquisitions and allows small inefficient firms to remain in business. Thus, deregulation would lead to mergers which would result in economies of scale, economies of scope and the replacement of poor management by superior management.

<sup>3</sup> The theory was developed in Stigler (1971).

With regard to the first of these, the benefits of lower prices which might arise from deregulation have to be weighed against costs such as possible reductions in the stability of the system and increased risk of loss for consumers. Unfortunately for the second proposition, studies of the very considerable merger activity that took place in US banking in the 1980s and 1990s have produced no convincing evidence of increased efficiency or profitability.<sup>4</sup> On the other hand, if there were significant economies of scale, and mergers occurred to take advantage of them, it would become difficult for new entrants to come into the market, even in the absence of regulation.

It therefore seems that none of the criticisms of regulation provide sufficient reason to reject all regulation, though they do point to matters that must be taken into account in decisions as to how much regulation there should be and what form it should take.

With regard to the form of regulation, we must first ask who should carry out the regulation – the government or a government agency, or the industry itself (*self-regulation*). The argument for self-regulation has two elements. Firstly, the industry has a commercial incentive to protect its own reputation and so members will be prepared to pay to achieve this, thus overcoming one of the principal market failure arguments for government regulation. Secondly, practitioners understand the needs of the industry and are likely to interfere less with its efficient functioning. This counters a common complaint against public regulatory bodies that, because they will be heavily criticized over the collapse of firms but not praised for actions that lead to lower prices, they will always impose excessive safety standards, raising the cost of regulation to both producers and consumers.

The assumption then is that self-regulation is almost certain to be lighter than regulation by an external body. There is a danger, however, that self-regulation may turn out to be an awkward halfway house. To begin with, it must be supported by some government regulation at least to the extent that firms are legally required to join the industry regulatory scheme. Otherwise, an incentive would be created for some firms to act as free riders, hoping to benefit from any increase in reputation of the industry resulting from the behaviour of firms within the regulatory organization without paying the costs of membership.

More importantly, self-regulation will only create less moral hazard than public regulation to the extent that it leaves an element of risk for both consumers and producers. The problem is that once an element of risk exists, the degree of risk has to be assessed to allow a judgement to be made of the risk/return profile of an investment. This should cause no worries to professionals, but the general public faces two types of difficulty. Firstly, it may be time-consuming and costly to acquire the necessary knowledge to assess risk accurately. Secondly, the ability of non-experts in a field to assess risk is notoriously poor. There is a strong tendency for people to respond to risk by adopting one or other extreme position. They may, as responses to food scares show, eschew a product or activity completely as soon as an element of risk is made clear. Alternatively, they may, as people's behaviour as car drivers and smokers attests, believe that risk only exists for other people. Thus, the possibility of consumers assessing risk at all accurately is remote, especially in markets that are characterized by asymmetric information and where producers have both the incentive and the capacity to mislead consumers.

Further, the existence of consumers who are, in the field of finance, risk takers or who underestimate the true level of risk ensures that dubious firms will continue to survive despite the apparent reduction of moral hazard. On the other hand, those who are risk averters or who overestimate the true risk may be driven away from products from which they might have benefited.

Nor does self-regulation perform particularly well in terms of the other complaints about regulation. By definition, self-regulation places regulation in the hands of the producers. Indeed, it places it in the hands of *existing* producers and provides an incentive for them to use regulation to increase barriers to entry to the industry. Thus, it may lead to a lowering of some kinds of compliance costs, but not necessarily all.

Many of the problems of self-regulation can be illustrated by a consideration of the operation of the UK's *Financial Services Act* of 1986. The Act set up a regulatory system for the City of London with the aim of creating a flexible system of self-regulation which inspired confidence in both market practitioners and investors. It established a new principal regulatory authority, the Securities and Investment Board (SIB),

<sup>4</sup> See Rhoades (1992).

which recognized three types of organization: a number of self-regulatory organizations (SROs) which were composed of investment practitioners and which were given the responsibility of regulating their own segment of the industry; a group of recognized professional bodies (RPBs) whose task it was to maintain the standards of the lawyers, accountants, insurance brokers and actuaries who participate in the market; and a number of regulated exchanges.

The Act covered all financial services. An initial problem was with the classification of the industry for the purpose of defining membership of the SROs. This is far from easy because of the overlapping of activities. For example, life assurance firms not only provide insurance but also run pension funds, have an interest in housing finance, engage in fund management and provide investment advice. Banks also participate in a variety of fields and overlap with insurance companies in some ways. This problem increased with the *functional integration* of financial services firms. A single firm may now<sup>5</sup> be engaged in banking, insurance and securities business.

The argument that self-regulation is desirable because practitioners understand best the needs and working of an industry requires that regulation should be undertaken by experts. The complexity of the various elements of the industry, in turn, means that the regulatory needs of the various activities will be different and that there should be a number of SROs each dealing with a precise segment of the industry. Yet this is bound to produce some overlap among the SROs. It follows that if the legal requirement is for firms to join only one regulatory organization, some will be able to choose which organization to join and the separate SROs may find themselves competing for members.

This introduces the possibility of **competitive laxity** with those regulating authorities that try to maintain high standards losing out to those that choose to reduce standards in the interests of their members. In this way, the regulating authorities might act as trade associations, looking after the interests of their members, and underplaying the role of consumer protection. Some regulators may attempt to maximize membership by keeping subscriptions low, reducing their ability to supervise the behaviour of members. A

#### More from the web

A good way to stay in touch with what is happening regarding the regulation of financial markets in the UK is to read the press releases on the Financial Services Authority (FSA) website. Go to [www.fsa.gov.uk](http://www.fsa.gov.uk) On the home page, click on News and Events and then Press Releases (currently on the right hand side of the News and Events page). This will give you direct access to all the FSA's 2005 press releases in date order from the most recent down. If you wish to look for older news, you will also find press releases for all years back to 1999. A press release usually provides a short summary of the issue under consideration and provides links to allow you to obtain more detail if you need it.

case in point in Britain in the early 1990s was FIMBRA (the Financial Intermediaries, Managers and Brokers Regulatory Association), one of the original SROs set up by The Financial Services Act. FIMBRA kept its subscriptions low and as a result soon ran into financial problems. It then had to be rescued by loans from its larger members, causing it to be heavily dependent on a small number of members who could transfer to other associations if the actions of FIMBRA did not suit them. One of the consequences of the weakening of the regulatory system in this way was the Maxwell pension fund scandal which is set out in Box 25.2.

In addition, as the Chairman of Britain's Securities and Investment Board (SIB), Andrew Large, admitted in 1993, self-regulation is often seen to equate with self-interest. This was particularly true of the City of London self-regulatory system as a result of the uncovering of a large number of illegal activities and institutional collapses in the late 1980s and 1990s.

The system was given the benefit of the doubt for some years on the grounds that a complex system needed time to settle down. However, in 1997, 11 years after the Financial Services Act, the industry was still struggling to cope with issues such as the failure of agents to seek the best prices for clients and the giving of unsuitable investment advice. It was clear that a more trusted system was needed and in May 1997

<sup>5</sup> A significant amount of functional integration has always existed in countries such as Germany and Austria in which banks have been universal – able to provide a wide range of banking and securities services. On the other hand, self-regulation has not been practised in those countries.

**Box 25.2 Maxwell and the pension funds**

On 31 October 1991 the body of the newspaper tycoon, Robert Maxwell, was discovered floating in the sea off the Canary Islands. During the subsequent unravelling of the affairs of the Maxwell group of companies, including Maxwell Communications Corporation (MCC) and Mirror Group Newspapers (MGN), massive fraud was discovered relating to the pension funds of the Maxwell companies.

Two types of problems were uncovered. The first was the management of the pension funds in the interests of the Maxwell family rather than the investors in the fund. When Maxwell had taken control of the MGN fund in 1985, investments were largely in UK blue chip equities. By April 1990, more than half of the 20 largest investments in the fund's portfolio were in companies with which Maxwell had a connection or in his own private interests. This was clearly contrary to general trust law which lays down three obligations for trustees:

- to diversify investments;
- to avoid exposing beneficiaries to undue risk;
- to act reasonably.

However, much worse was to follow. During 1991, Maxwell siphoned off up to £1 billion from the pension funds of his companies in the form of unsecured loans for his own use in defending his seriously troubled empire. When the Maxwell companies collapsed, this money was lost, leaving several of the funds unable to meet their obligations to pay pensions to employees and former employees.

**How could this have happened?**

Pension funds accounts are required by law to be kept separate from company accounts. A board of 'independent' trustees is appointed to oversee the running of the fund. However, Maxwell was able to appoint his own trustees and did so to good effect. There was a gradual erosion of representation of employees on the board and most trustees appeared to know little of what was being done in their name. Maxwell managed the funds through his own private management firm, Bishopgate Investment Management (BIM). It was subject to inspection by auditors and to regulation by one of the SROs, IMRO (the Investment Management Regulatory Organization).

A report compiled by the House of Commons social security select committee later described the events as a 'spectacle to make even Pontius Pilate blush' as everyone in the City seemed mainly concerned to deny blame. The report concluded that if the regulators had 'acted with the proper degree of suspicion . . . and if professional advisers' care had been commensurate with their fees . . . then the Maxwell pension funds would have been secure' (*Financial Times*, 10 March 1992, p. 8).

The report particularly criticized the accountancy firm, Coopers & Lybrand Deloitte, which had detailed serious shortcomings in the way BIM managed the pension funds as early as February 1991 but had reported this only to the pension fund manager and only rarely attended meetings of the trustees of the funds. IMRO was also heavily criticized. It had investigated BIM only five weeks before Maxwell's death but had claimed to find nothing wrong. They had failed, said the select committee, to spot stealing on a massive scale. It added that self-regulation was little short of tragic comedy.

the government announced the return to full statutory regulation under a single regulator, the **Financial Services Authority (FSA)**.

The Financial Services Authority (FSA) was launched on 28 October 1997 as the single regulator for all financial firms and markets, with its powers being confirmed by the *Financial Services and Markets Act* (FSMA), which received royal assent in June 2000. The process was not completed until the second half of

2001 when the FSMA came fully into operation. The FSA took over the responsibility for supervision from a number of regulatory and self-regulatory organizations including the Bank of England, the Securities and Investment Board, the Building Societies Commission, the Friendly Societies Commission, the Insurance Directorate of HM Treasury and the Registry of Friendly Societies. The FSA took over direct regulation of the banking sector in June 1998 but initially

**Box 25.3 Financial ombudsman service**

As well as setting up the FSA, the Financial Services and Markets Act 2000 established a single financial services ombudsman to help settle disputes between consumers and financial firms. This combined the work of four separate complaints procedures under the previous regulatory system. The introduction of an ombudsman into a regulatory system has two purposes – to increase public confidence in financial markets and thus to encourage consumers to participate in these markets despite the manifest risks of doing so; and to attempt to redress a perceived imbalance in financial markets resulting from consumer ignorance and asymmetric information.

The ombudsman can consider complaints about a wide range of financial matters and the service is free to consumers. The decisions of the ombudsman are binding on firms but not on consumers. Consumers, having first complained to the firm with which they have a grievance, can take their cases to the ombudsman. If the decision there is not to their liking, they retain the ability to go to court. The ombudsman does not, as the FSA can do, either punish or fine firms for breaking rules.

The ombudsman service applies compulsorily to all firms regulated by the FSA for certain types of complaints. In addition, firms not regulated by the FSA can volunteer to participate in the service. Further, firms that are regulated by the FSA can volunteer to have the ombudsman consider types of complaints that are not part of the ombudsman's compulsory jurisdiction. Through consultation, the Financial Ombudsman Service has sought to widen the range of complaints with which it deals.

In the year ended 31 March 2002, 43,330 new cases were referred to the case handling teams – a 38 per cent increase in the previous year. Unsurprisingly, the biggest area for complaints was endowment policies linked to mortgages (14,595 cases). Next came complaints about personal pension plans (5,881 new cases).

the other previously existing organizations continued to act on behalf of the FSA while it built up its organization and its handbook of rules and guidance and developed its regulatory philosophy.

The FMSA set the FSA four objectives: market confidence; consumer awareness; consumer protection; and fighting financial crime. Under the new scheme each firm obtains from the FSA a single authorization to carry out financial business in the UK with an associated list of permissions setting out what the FSA allows it to do. Under the old regulatory system, many firms had had a number of authorizations from different regulatory bodies. Single compensation and ombudsman schemes were also developed and from the second half of 2001 all financial firms were, for the first time, subject to a single regime for tackling 'market abuse', a non-criminal offence that was added to the already existing criminal offences of insider trading and market manipulation. Three categories of market abuse have been defined: misuse of information; giving false or misleading impressions; and market distortion.

The FSA aims 'to maintain efficient, orderly and clean financial markets and to help retail consumers achieve a fair deal'. The FSMA requires the FSA to

be efficient and economic in its use of resources and thus it focuses its efforts on what it sees as the most significant risks to the achievement of its statutory objectives, while taking into account the principles of good regulation. Thus, the FSA is not seeking to discourage appropriate risk taking by regulated firms or investors. Risk is accepted as inherent in financial markets and the FSA believes that it is neither practicable nor desirable to try to develop a regime in which there are no failures of financial firms. Attempts to do so simply produce heavy-handed and expensive regulation that restricts innovation and interferes with competition.

This leaves the FSA with a very fine line to walk and it has been criticized from both directions – as being too large and bureaucratic and as failing adequately to observe and prevent developing risks facing consumers. Particular problems over which the FSA has been criticized include split capital investment trusts (see Box 25.4), Equitable Life and endowment mortgages.

In relation to Equitable Life (see Section 3.5), the FSA was criticized for its failure to spot problems and to follow up issues that had been uncovered although it was partly excused because the problem had developed during the period in which the FSA

**Box 25.4 Consumer protection – split capital investment trusts**

Split capital investment trusts are investment trusts – companies listed on the London stock exchange that raise funds to invest in other companies. Investors benefit from both dividend income and capital growth. Split capital trusts typically have two types of shareholders with different investment needs – those interested principally in income who collect dividends and expect their capital returned at the end of the trust's life; and those interested in growth who opt for zero dividend preference shares (zeros), receiving in return for forgoing dividends a share in all the capital growth of the fund at the end of its life.

In the late 1990s, when share prices were booming, split capital trusts were heavily marketed and extravagant promises were made. High annual rates of return were mentioned and the trusts were said to be 'low risk'. Shares in the trusts were bought, in particular, by parents saving for school fees and pensioners wanting income or lump sums. But when share prices began to fall sharply in 2000, many trusts did not have enough cash to pay the scale of dividend they had promised. Some trusts borrowed heavily to buy more shares (they became heavily geared) and also invested in each other (cross-holdings). One trust lost over 68 per cent of its value in one year. By October 2002, eight split capital trusts had called in the receivers and up to 40 of the 120 trusts were thought to be in serious trouble. Perhaps 50,000 people lost money in the trusts, some losing heavily. There were stories of pensioners losing their homes.

Initially it was thought that losers had little chance of compensation. The investment industry sought to blame the buyers of zeros. Further, since investment trusts are technically companies rather than regulated funds, the Financial Services Authority claimed no responsibility for them and the Financial Ombudsman Service could only deal with them on a voluntary basis.

However, in February 2003, the House of Commons Treasury Select Committee issued a report on the trusts, which accused one of the biggest firms in the sector, Aberdeen Asset Management, of recklessly misleading promotion. More generally, it suggested widespread conflicts of interest and collusive behaviour in the sector, possibly amounting to corruption. This considerably increased the prospects of investors suing companies for mis-selling. The Treasury Committee chair called for compensation with extra cash where collusion or corruption could be shown.

Following an investigation into the selling of splits, the FSA proposed to the firms involved that they take part in collective settlement negotiations aimed at ensuring that, where appropriate, firms paid compensation to investors and took disciplinary action against staff. It also proposed the introduction of a number of safeguards on the operation of splits in the future. These included a limit to be placed on the extent to which firms can cross-invest in each other, changes to the nature and content of warnings about the risks to capital, and the strengthening of the independence of the company from its investment manager.

The split capital investment trusts affair illustrates several points:

- (a) The notion of *moral hazard* – the existence of a powerful regulator and an ombudsman leads small investors to feel their investments are secure. They do not, as a result, always read the 'small print' attached to financial products, even though it could be argued that the high rates of return offered should have alerted investors to the degree of risk they faced.
- (b) The difficulty in determining the extent of consumer responsibility for their loss. Was this really a case of mis-selling with innocent consumers being misled by dissembling or dishonest professionals? Or were consumers led into the investment partly by greed – the promised high rates of return causing them to act in a foolish way? This raises the question of how much consumer protection should be provided.
- (c) The damage to the industry caused by cases such as these – the Association of Investment Trust Companies felt the need to set up a hardship fund to help out even before any decision had been made as to whether mis-selling had occurred, seeking contributions from fund managers who wanted to restore the battered reputation of the investment trust sector.

was being set up (between January 1999 and December 2000) during most of which, regulation was being carried out on the FSA's behalf by its predecessor, the Personal Investment Authority (PIA).

The mis-selling of endowment mortgages also began well before the FSA came into existence. Until recently many people chose to take out interest-only mortgages accompanied by endowment insurance policies.

These require two separate payments to be made each month – an interest payment and the premium on the endowment policy. The idea is that the endowment policy should grow over the period of the loan (say 25 years) sufficiently to pay off the original amount borrowed. Endowment mortgages could, if bonuses were high, return to the policyholder at the end of the period a sum greater than that needed to repay the mortgage. However, they carry risks since the bonus rate paid on the policies depends on the performance of the investments made by the insurance company which, in turn, depends on the rate of interest in the economy and on the performance of the stock and bond markets.

Millions of these policies were sold in the 1980s and 1990s but the performance of the policies deteriorated sharply in the second half of the 1990s because of low inflation and low interest rates. The problem was compounded from late in 2000 by falling share prices. Early in 2000, it became clear that many of these policies would not meet the mortgage in full at the end of the period. Policyholders were faced with either having to meet the difference at the end of the period or to make top-up payments to the insurance company to ensure that the mortgage would be paid off. Estimates of the number of policyholders facing a shortfall in their policies and of the extra amounts they would need to pay depended on the rate of bonus assumed for the rest of the life of the mortgage. It was clear, however, that the problem was very large.

The FSA required all companies to calculate the position of all policies at assumed rates of 4 per cent, 6 per cent and 8 per cent to maturity and to advise all policyholders of their position during 2000. They also specified that the letters should set out all the available options to policyholders and should not give more weight to the possibility of solving the problem by increasing the premium paid. Companies were only obliged to look at policies taken out from 29 April 1988, the date that the Financial Services Act came into force.

Was this just an unfortunate result of the change in economic conditions and a case of ‘let the buyer beware’? After all, people could have opted for straight repayment mortgages but chose the riskier endowment repayment method in the hope of receiving a higher return. Yet things were not as straightforward as this. In October 2000, the FSA accepted that hundreds of thousands of people might have been mis-sold

endowment policies. It became clear that many policyholders had not been told that their policies carried any risks and had been allowed by the insurance companies to understand that their policies would definitely pay off their mortgages.

People who believed they had been mis-sold endowment mortgages were able to apply for redress to the Financial Ombudsman Service or, where the company that sold the policy had gone out of business, to the Financial Services Compensation Scheme. Some insurance companies pledged to make up shortfalls whether or not the policies had been mis-sold. People sold endowment mortgages before 29 April 1988 had little chance of receiving compensation, although some companies agreed to allow the Financial Ombudsman Service to consider on a voluntary basis complaints of mis-selling before that date.

Although mis-selling appeared to have been widespread, the FSA refused to instigate a case-by-case review of the problem, despite criticisms of it by consumer bodies and the FSA’s own Consumer Panel. The FSA argued that such a review was not needed because the vast majority of policyholders were better off than they would have been if they had taken up a simple repayment mortgage. So, even if they could prove that the risks were not explained, they would not be entitled to compensation. However, critics argue that if people, realizing that they had been mis-sold an endowment policy, now surrendered the policy and converted to a simple repayment mortgage they would lose. The chief ombudsman at the Financial Ombudsman Service said that, provided these consumers could show they were mis-advised, they would be entitled to additional compensation for the loss.

The FSA could, however, claim that it had taken advantage of the new provision in the FSMA permitting it to penalize companies for market abuse, giving a clear message to firms in the market that it would not tolerate the mis-selling of products. It has fined several companies for mortgage endowment failings. For example, in March 2003, Royal and Sun Alliance Life and Pensions Limited was fined £950,000 for mortgage endowment mis-selling and related deficiencies in its sales system. This, the FSA could maintain, will help to overcome failings in the financial services market in the longer term even if all individual problems are not picked up and dealt with as speedily as they might be.



The FSA has also sought to overcome general problems by paying great attention to the objective of consumer awareness. Firms are only able to mis-sell products to consumers because of the high degree of consumer ignorance regarding financial services. Clearly, if the FSA could help to reduce consumer ignorance it would also help to overcome market abuse. Nonetheless, high-profile failures in markets such as the cases dealt with here continue to be a problem for market confidence, the first of the FSA's objectives.

The FSA interprets the statutory objectives of consumer awareness and consumer protection broadly and sees itself as having an important educational

role. It has also seen fit recently to become involved with the issue of financial exclusion, which has been of increasing concern in recent years and is dealt with in Box 25.5.

The difficulties faced by financial regulators everywhere have been increased by the *globalization* of financial markets. In the period since 1980 there has been a very rapid growth in the stock of cross-border bank assets and cross-border securities transactions. Both the sheer size and the interdependence of markets now pose problems. The Bank for International Settlements (BIS) has warned that essentially local events might have disruptive implications for the whole international financial system.

### Box 25.5 The FSA and financial exclusion

'Financial exclusion' is the exclusion of significant numbers of people from financial services: from particular sources of credit, insurance, bill payment services and accessible and appropriate deposit accounts. People may be excluded as a result of the policies and behaviour of the financial services industry or they may be 'self-excluded' because of the type of financial products available or their assumptions about the likely behaviour of financial institutions. That is, they might not apply for financial services because they assume they will be rejected.

Poor members of the community, in particular, lone parents, people with disabilities, the unemployed, and those on low wages, are the most likely to be financially excluded. For them, financial exclusion is one aspect of general deprivation – a major element within 'social exclusion', which implies a lack of economic, political or social citizenship. However, financial exclusion is not limited to the poor. There may be problems also for ethnic minorities as well as for those who do not conform to the standard picture of credit-worthy people used by financial institutions in risk assessment.

According to recent research estimates published by the FSA, around 7 per cent of households in Britain (1.5 million) have no basic bank or building society account. Around 20 per cent of adults lack a current account, while 27 per cent of employees do not have an occupational or private pension. Up to a quarter of households have no home contents insurance and 45 per cent have no life insurance cover.

Exclusion from financial services carries a number of costs for those excluded. It denies them the ability to borrow and thus to arrange their financial affairs optimally or it forces them to borrow from 'unofficial' sources, possibly at very high interest rates; it denies them discounts on many bills available to people able to pay by direct debit; it greatly reduces their ability to deal with household and personal emergencies because of their lack of insurance and it greatly reduces their ability to plan for the future and to cope with old age and sickness. Because financial exclusion is concentrated both among particular groups and geographically, whole communities are disadvantaged in these ways.

Although dealing with financial exclusion is not a direct responsibility of the FSA, it has acknowledged the need to consider the impact of its regulations on the more vulnerable sectors in society. In July 2000, in conjunction with the University of Bristol, the FSA published a report entitled *In or out – financial exclusion*. This identifies the following ways of tackling financial exclusion:

- improving financial literacy and lowering psychological barriers to using financial services;
- increasing access through outlets such as supermarkets, post offices and credit unions;
- providing simple and low cost financial products;
- providing appropriate regulation of benchmarked products to reduce costs;
- ensuring appropriate regulation for not-for-profit organizations such as credit unions and proposed community banks to provide vulnerable consumers with adequate levels of protection.

Globalization has also caused fears of competitive laxity among national regulatory authorities. A national authority may feel that too strict regulation could leave its own country's firms at a competitive disadvantage in comparison with firms based in countries with less stringent rules. Since much of the financial services industry is footloose, strict regulation in one country may cause firms to move their operations to other countries, possibly resulting in a considerable loss of income and employment to the country attempting to operate a responsible regulatory regime. To the extent that regulations are loosened everywhere and/or that firms do move to more poorly regulated areas, the level of systemic risk through contagious financial disorders may be increased.

We have seen, in Chapter 21, the problems faced by the EU in its attempt to ensure fair competition among firms from different member states. The principle of *home* regulation which the EU has chosen must tempt firms to locate their head offices in the member states with the most producer-friendly regulations. One way of attempting to remove the consequent dangers of competitive laxity among member governments is through the harmonization of regulations aimed to reduce cross-border systemic risk. However, as Dale (1996) notes, the decision made by the European Commission as to which regulations must be harmonized appears to have had more to do with competitive than with systemic concerns – the principal motivation of the *Investment Services Directive* and the *Capital Adequacy Directive* seems to have been to ensure competitive equality between universal banks and non-bank investment firms.

Financial innovation and rapid technological change in the financial services industry have posed yet more major problems for regulators. The development of screen-based trading systems, securitization and the rapid growth in the availability of new, sophisticated derivatives have all complicated the job of the authorities. Especial concern has been expressed over the growth of off-balance-sheet risk and the risk posed by fast-changing on-balance-sheet positions. The traditional regulatory, accounting and legal framework for financial organizations which depended on the regular scrutiny of balance sheets has been left behind by such developments. We look at these questions in Section 25.4 below.

We can sum up by saying that regulation of financial services faces many serious problems and may, under certain circumstances, make matters worse. We

#### More from the web

Another good source for regulation stories is the website of the Financial Ombudsman Services: [www.financial-ombudsman.org.uk](http://www.financial-ombudsman.org.uk). Click on 'News'. On the News page, you will find headings of recent news items with links to full reports. Again, if you need old news, you will be able to consult stories for each year back to 1998.

have seen, however, that self-regulation does not provide a simple remedy for such problems. We shall see in Section 25.4 that government regulators have no choice but to work with the industry itself in the operation of regulatory regimes, but there remains a strong case for regulatory bodies which are external to the industry. Certainly, the difficulties of regulation do not justify complete deregulation of the industry. It has been frequently argued by those in favour of deregulation that financial markets are not different in kind from other markets but only in degree and so should not be treated any differently. However, large differences in degree are equivalent to differences in kind. Financial markets are of great importance to the economy as a whole and to a large number of individual consumers. Views about their regulation cannot satisfactorily be derived from the treatment of non-financial markets.

### 25.3 Banking regulation

We have mentioned two regulatory issues in banking:

- the possibility of contagion as the result of a run on one bank turning into a *panic* which might lead to a serious reduction in liquidity for the system as a whole;
- the need for consumer protection, given the nature of the banking industry and the cost and difficulty of acquiring knowledge.

We have added to these the need to cause as little moral hazard as possible, to keep compliance costs low and to interfere as little as possible with competition either by creating barriers to entry or exit or by favouring some institutions over others within the market.

A common approach to ensuring the stability of the banking industry has been to prevent banks from participating in the more risky aspects of finance by limiting them to deposit creation and lending functions. Thus, we have seen in earlier chapters that in both the United States and Italy, legislation passed during the 1930s rigidly separated commercial banking from investment banking and other financial activities. Since banks could provide a wider range of financial services not just in their own name but through the acquisition of other companies, this had to be supported by legislation that restricted the ability of banks to acquire non-banking firms and vice versa. In the United States, for example, the *Bank Holding Act, 1956* sought to prevent companies owning banks from being allied with insurance companies, securities firms and commercial enterprises. Such a separation fitted well with the British and American model of banking in which the various kinds of banking business were typically provided by different types of banking organization. In particular, deposit-taking banks concentrated on short-term lending. This contrasted with the universal banking model common in northern Europe.

Other approaches to ensuring the stability of banks have included guaranteeing the liquidity of the overall banking system by giving the central bank the role of lender of last resort to the system, seeking to prevent runs on individual banks by introducing some form of deposit insurance scheme, placing limitations on interest payments on deposits to prevent competition for deposits (liability management), and establishing barriers to entry also with the intention of limiting competition among banks.

We have seen that all of these restrictions have come under challenge in recent years. High and variable inflation and interest rates put pressure on traditional specialized savings institutions. In the United States this was magnified by legal restrictions on rates of interest payable on retail deposits. As financial services became an increasingly international industry, governments became concerned about the competitiveness of their domestic financial industries hobbled by tight regulation. In a world of increasingly mobile capital, firms found their way around existing restrictions and sooner or later forced legislative changes which gave them greater freedom. Diversification of asset bases provided benefits in an increasingly risky environment and firms sought to benefit from economies of both scale and scope. The financial conglomerate was born.

All of this was fostered by an anti-government mood in the worlds of both business and finance.

In such a world, fears of instability have increased and the issue of bank supervision at both national and international levels has grown in importance. In supervising banks, regulatory authorities are concerned particularly with questions of capital adequacy, liquidity, asset quality and the concentration of risks.

Capital adequacy is central because a bank's capital must be sufficient to absorb losses and to finance the operation of its business. The modern approach to the assessment of a bank's capital adequacy is based on a calculation of its **risk–asset ratio**. This involves a number of steps:

- a definition of the elements of capital for supervisory purposes;
- the allocation of weights to different broad categories of asset (e.g. cash, government securities, loans to banks, loans to firms and households);
- the expression of capital as a percentage of total risk-weighted assets.

The weights applied in the second step reflect the degrees of risk associated with the different categories of assets. More risky assets have higher weights. Thus, an increase in the proportion of a bank's assets regarded as risky increases the size of its risk-weighted assets and lowers the ratio of capital to risk-weighted assets.

Liquidity relates to the ability of a bank to meet its obligations on time, especially in relation to repayment of interbank borrowings and customer deposits. This is essential if a bank is to maintain its reputation. Given that the survival of a bank depends on the retention of the confidence of its depositors, the maintenance of reputation is critical. Thus, banks must actively manage liquidity. Banks seek to do this in three ways. Firstly, they hold a stock of readily marketable liquid assets that can be turned into cash quickly in response to unforeseen needs. Secondly, in doing this, they identify mismatches between potential receipts and payments in future periods. Thirdly, banks respond to potential mismatches of this kind by borrowing in the market to smooth out cashflows in particular time periods. Regulators may attempt to ensure the continued liquidity of banks by, for example, imposing a required minimum liquidity ratio (a ratio of assets of short maturity to total deposits) and/or by setting limits on mismatches or net positions in particular

time bands. In doing the latter, they would allow liquid assets to be included in the calculation at a maturity earlier than their final repayment date to reflect their marketability.

The main issue in relation to the quality of a bank's assets is the ability of its borrowers to service and repay loans. The poor quality of the loans of many banks has been a central element in the problems faced by the Japanese banking system in recent years. It was also an issue in the international debt crisis of developing countries of the 1980s. The early identification of problem loans is important if remedial action is to succeed. One way of doing this is to employ a grading system that classifies loans in the range from trouble-free to problematic or, worse, non-performing. Some countries, including the USA, assign ratings to individual loans in the attempt to evaluate the quality of banks' assets on a consistent basis.

The concern about risk concentration comes from the dangers that arise when banks make very large loans to a small number of borrowers. If loans to a few borrowers make up a high proportion of a bank's assets, then default on these loans can create serious problems. Thus, the greater the concentration of loans, the larger is the potential for loss on the part of the bank. The usual regulatory response is to limit exposures to single counterparties, or groups of counterparties, to the equivalent of some proportion of the bank's capital base. Overexposure to a few borrowers was particularly in evidence in the international debt crisis of the 1980s. Dangers can also arise for banks if deposits come from a narrow range of sources, if individual deposits are large and volatile, if income derives from a small number of transactions or activities, if there is overspecialization in the bank's product range, or if a high proportion of loans are made against one particular kind of collateral.

In the UK, banks were regulated by the Bank of England until June 1998, when responsibility for their supervision passed to the Financial Services Authority (FSA). The FSA is now responsible for enforcing the Banking Act, 1987 and the relevant European Union banking directives. The Act, the content of which is covered in Section 3.2, has been supported by a large number of papers setting down prudential rules. These have related, among other things, to the capital asset and liquidity ratios banks are expected to maintain,

the measurement of capital, the supervision of the off-balance-sheet activities of banks, and the suitability tests applied to people wishing to become large shareholders in UK banks. In July 1998, the FSA produced its own guide to bank supervisory policy, although this remained heavily dependent on previous publications of the Bank of England.

The Bank of England, and since 1998 the FSA, have also been much concerned with international aspects of bank regulation. In January 1987, the Bank of England and the Board of the Federal Reserve System of the United States announced their intention to bring the supervision of banks' balance sheets in the two countries into line. In 1993 proposals put forward by the Basel Committee in 1988 were adopted by all industrial countries as the basis for a common system of bank supervision. These proposals initially centred on the risk-asset ratio approach described above, although additional rules have since been developed. The European Union has included the various Basel proposals in its banking directives, and these are in turn required to be incorporated into the domestic legislation of EU member countries.

#### 25.4 The impact of globalization and financial innovation – the Basel Committee

The globalization of the banking industry led to a great increase in international interbank lending and increased dramatically the possibility that the collapse of a bank in one country could cause serious losses for banks in other countries. Regulators became strongly aware of this danger with the collapse in 1974 of both the Franklin National Bank in New York and the Herstatt Bank in Germany. At the same time, there was increasing worry over the gravitation of banks to the least regulated national jurisdictions with resulting competition in regulatory laxity between financial centres. One outcome of these concerns was the setting up of a standing committee of bank supervisors under the auspices of the Bank for International Settlements (BIS). The committee comprised representatives of the bank supervisors of the 11 Group of Ten countries<sup>6</sup> and of Luxembourg. Its formal title was the Committee on

<sup>6</sup> USA, UK, Japan, Germany, France, Italy, Canada, Netherlands, Belgium, Sweden and Switzerland.

Banking Regulation and Supervisory Practices but it has become known as the Basel Committee. It sought to link together the different regulatory regimes in different countries in order to ensure that all banks were supervised according to certain broad principles.

The initial concern of the committee was to establish guidelines for the division of responsibilities among the national supervisory authorities and this led to the signing of the Basel Concordat in December 1975 by the central bank governors of the Group of Ten. This distinguished between 'host' and 'parent' authorities and between branches and subsidiaries of foreign banks. Under the Concordat, the supervision of foreign banking establishments was to be the joint responsibility of parent and host authorities. Host authorities were to be responsible for the supervision of the liquidity of foreign banks. Solvency was to be the responsibility of the parent authority in the case of foreign branches and of the host authority in the case of foreign subsidiaries. Great stress was laid upon the exchange of information between host and parent authorities.

The Concordat was voluntary but all countries represented on the committee adopted its rules. However, it soon became clear that there was a good deal of confusion over the interpretation of the rules. The confusion increased following the adoption in 1978 of a rule that the international business of banks should be conducted on a consolidated basis to limit the opportunities for regulatory evasion since this appeared to conflict with the earlier granting of responsibility for the solvency of foreign subsidiaries to host authorities. A second problem was that the different supervisory standards among countries led some countries, notably the USA, to be more reluctant than others to share or delegate supervisory responsibilities. The collapse of Banco Ambrosiano's Luxembourg subsidiary in the summer of 1982 caused particular concern as neither the Luxembourg nor the Italian authorities would accept responsibility for either supervision or emergency support of the bank, in part because the Luxembourg subsidiary was technically a holding company rather than a bank. In an attempt to overcome the various problems, the Concordat was revised in 1983 with the revision being based upon the principle of consolidated supervision and provisions designed to ensure adequate supervisory standards. The aim was to encourage national authorities to lock out foreign banks originating from permissive jurisdictions and to prevent their own banks from conducting their international operations from poorly

regulated centres. The adoption of the principle of consolidated supervision was intended to make the solvency of foreign subsidiaries a joint responsibility of parent and host authorities. Foreign bank subsidiaries were required to be financially sound in their own right, while also being supervised as integral parts of the group to which they belonged. Responsibility for the supervision of liquidity of both foreign branches and subsidiaries was to remain with host authorities. The new agreement also introduced more precise guidelines for the supervision of holding companies.

Despite the changes in the revised Concordat, problems remained and these were highlighted by the pressure placed on the international banking system by the debt crisis of the developing countries during the early 1980s. When, early in 1982, the Mexican government declared a moratorium on debt repayments, there was a potential crisis for international banks which had lent Mexico vast amounts over the previous eight years and possibly for the whole international financial system. Several banks had lent to Latin American countries (especially Mexico, Argentina and Brazil) considerably more than their total capital. In 1982, claims of selected US banks on five major Latin American debtors ranged from between 140 and 260 per cent of the paid-in capital of the banks. In many cases, loans to a single country were more than half the bank's capital. Thus, if Mexico had continued to default on its repayments and if other countries had followed suit, a number of banks would have been wiped out. This possibility raised the spectre of the contagious bankruptcy of many other banks. The IMF, the World Bank and the USA combined to help banks out of these particular problems, but the view took hold that a degree of harmonization of supervisory standards was needed among national regulatory authorities.

The principal outcome of this was the Basel minimum capital adequacy guidelines for international banks approved in July 1988 which established common prudential risk-adjusted ratios for banks to apply from the beginning of 1993. In discussing the risk-asset approach above, we mentioned the need to define the elements of capital for supervisory purposes. The Basel agreement initially distinguished between two types of capital:

**Tier I capital (core capital)** consists principally of shareholders' equity, disclosed reserves and the current year's retained profits, which were readily available to cushion losses – these must be verified by the bank's auditors.

**Tier II capital (supplementary capital)** comprises funds available but not fully owned or controlled by the institution, such as ‘general’ provisions that the bank has set aside against unidentified future losses and medium or long-term subordinated debt issued by the bank.

Tier II capital cannot be more than 100 per cent of Tier I capital for the purpose of calculating the risk–asset ratio. A third type of capital (Tier III) was later defined.

**Tier III capital** consists of:

- (a) subordinated debt of at least two years’ maturity which is subject to a ‘lock-in’ clause (that is, it can only be repaid with permission from the regulatory authorities if repayment would cause the bank to breach its capital ratio); and
- (b) accumulated profit arising from the trading book (that is, securities and investment activities not traditionally regarded in the UK as banking business).

The weights to be attached to bank assets included: cash 0; loans to the discount market 0.1; interbank lending 0.2; home mortgage loans 0.5; other commercial loans 1. The Basel Committee proposed a lower limit of 8 per cent for the ratio of total capital to risk-adjusted assets, though national bank supervisors had some discretion in applying this to different types of bank and countries were free to impose a higher minimum requirement on their own banks. In the UK, the FSA sets each UK incorporated bank a separate target minimum capital adequacy requirement for both its banking and investment business, with the 8 per cent risk–asset ratio of the Basel Accord being an absolute minimum requirement for all banks. The agreement sought both to strengthen the soundness and stability of the international banking system and to ensure competitive equality among international banks.

Although the acceptance of the risk–asset approach was regarded as an important step towards increased financial stability in the world economy, as with all such measures, the application of the ratio influenced bank behaviour in ways that made regulation more difficult and may have increased overall risk in the system. In particular, an initial response of banks was to increase further the already growing proportion of their income derived from securitized off-balance-sheet activities. Box 25.6 provides a simplified example of the impact of asset securitization on risk–asset calculations.

#### More from the web

For stories on the regulation of international financial markets go first to [www.bis.org](http://www.bis.org), the website of the Bank for International Settlements. On the left-hand side of the homepage you will find a heading for the Basel Committee. Point at it and subheadings appear including the latest news on Basel II. It is also worth looking up the Financial Stability Institute, the heading for which is immediately below that for the Basel Committee. For information on financial stability, try also the Bank of England [www.bankofengland.co.uk](http://www.bankofengland.co.uk) and click on ‘Financial Stability’, one of the headings at the top of the home page.

Modifications were proposed to the Basel Accord to take this into account by making allowance for off-balance-sheet credit exposures. The idea was to convert these exposures into balance sheet equivalent amounts using a formula that takes account of the likely extent of the default risk involved. This proposal was taken into account in the preparation of the Basel II Capital Accord (see below). The question at issue then becomes the extent to which the formula used is such that an incentive still remains for banks to continue to move towards off-balance-sheet business.

Further changes to the accord were proposed to incorporate capital requirements for over-the-counter derivatives with the capital adequacy requirement being determined by estimates of current and potential credit exposure, taking into account the nature of the counterparty.

Other developments followed. In April 1990 an addendum to the Basel Concordat aimed to encourage more regular and structured collaboration between supervisors, with provision being made for supervisory consultations at the authorization stage. In the same year, the Committee tried to deal with the single most important cause of bank failures, excessive concentration of default risk. It did this by recommending common definitions and procedures related to large exposures, recommending maximum limits on single exposures of 25 per cent of the capital base.

That serious problems remained, however, became clear with the forced closure of the Bank of Credit and Commerce International (BCCI) in July 1991. BCCI’s corporate structure was based on a non-bank holding company in Luxembourg which owned two separate

**Box 25.6 Risk-asset ratios and off-balance-sheet activities – a simplified example**

A bank had the following set of assets:

Asset	Face value	Risk weighting	Risk-weighted value
Cash	50	0	0
Loans to discount market	150	0.1	15
Interbank loans	300	0.2	60
Home mortgage loans	1,550	0.5	775
Loans to small and medium-sized firms	2,150	1	2,150
Total			3,000

Under the rules of the Basel Accord of 1988, the bank was required to hold a minimum of 8 per cent of its risk-weighted assets as capital for regulatory purposes, 50 per cent of which had to be in the form of Tier I capital. Thus, it was required to hold 8 per cent of 3000 = 240. Tier II capital gives greater flexibility than Tier I capital and the bank chooses to do no more than meet the minimum requirement. Thus, it holds 120 in Tier I capital and 120 in Tier II capital. The bank then decides to increase its competitiveness by holding less capital and to seek to make up for any lost income through securitization and acting in the swaps market. It takes two steps:

- 1 it securitizes its home mortgage loans, removing them from its balance sheet and increases its loans to firms, which earn a higher rate of interest;
- 2 it also acts as a guarantor for swap deals to the value of 500, which also does not appear on the balance sheet.

The bank's risk-weighted balance sheet position now is:

Asset	Face value	Risk weighting	Risk-weighted value
Cash	50	0	0
Loans to discount market	150	0.1	15
Interbank loans	300	0.2	60
Loans to small and medium-sized firms	2,425	1	2,425
Total			2,500

The bank now has to hold only 200 capital and is able to reduce its Tier I capital to 100. Funds that previously had to be kept readily available to cushion possible losses could be used more productively.

When one takes into account the risk associated with the securitized home mortgages and the interest rate swaps together with the increase in loans to firms, it seems clear that the bank now faces more risk than previously. Yet it was required under the Basel Capital Accord of 1988 to hold less capital against the possibility of default.

It is easy to see why this type of activity worried the Basel Committee and led to the proposals in the Basel II Capital Accord regarding securitized assets.

banking networks incorporated in Luxembourg and the Cayman Islands. The holding company was unregulated and so consolidated supervision of the group was not possible, allowing BCCI to hide its problems by shifting assets between national jurisdictions. The Basel Committee responded to the BCCI affair by issuing a set of minimum standards for supervision of international banks.

However, other problems were coming to the fore, particularly with the very rapid growth in derivatives trading worldwide. The speed at which the risks of

derivatives can be transformed and the complexity of the transformation process result in a loss of transparency. This makes risk assessment much more difficult and, it was argued, weakened both market discipline and regulatory oversight, leading to greatly increased systemic risks. Risk was increased also, it was thought, because end users frequently did not understand how derivatives worked and the management of banks and securities houses often did not understand what their dealers were doing. This last problem is magnified to the extent that pay systems reward

traders hugely for success in achieving profits and provide them with little incentive to follow cautious strategies. We have also considered in Section 20.8 the argument that derivatives trading increases the volatility of financial asset prices. Finally, there were concerns over the concentration of derivatives trading among a few major financial institutions, with the possibility that the failure of a large derivatives dealer could both inflict large losses on counterparties and also damage the liquidity of the derivatives market.

One approach to the potential increase in default risk has been to encourage the use of **netting agreements** which create a single legal obligation covering multiple transactions between two counterparties, allowing them to reduce both the amount and the number of payments in comparison to settlements on a gross basis. In the USA, the International Swap Dealers Association (ISDA) drew up a master agreement which allows an intermediary to reconcile all of its transactions with a defaulted counterparty and come up with a final net payment, permitting the amount of capital set aside to support the business to be reduced by 50 per cent since the capital adequacy rules only have to be applied to the net value of transactions payments. In line with this, the Basel Committee amended the 1988 accord by reducing the capital that must be held against derivatives credit exposures which are subject to bilateral netting, subject to banks being able to demonstrate to their supervisors the legal enforceability of netting arrangements in all relevant jurisdictions. Regulators have also acted to include derivatives transactions in large exposure limits, along with conventional on-balance-sheet exposures.

The initial Basel proposals were concerned with *credit risk* – the risk that the bank's counterparty might not pay on the due date. Later Basel proposals were concerned with *market risk* – the risk that movements in the prices of financial instruments lead to loss. This had not been treated at all in the 1988 Accord. In April 1993<sup>7</sup> the Basel Committee published proposals for minimum capital requirements to cover banks' exposure to market fluctuations. Derivatives were to be converted into positions in the relevant underlying asset and become subject to capital requirements designed to capture specific and general market risk. However, this was criticized on the grounds that static

capital adequacy rules cannot capture the risk profiles of individual institutions. It was argued that a much more sophisticated approach was needed which made use of the complex risk management models used by the major derivatives dealers with regulators acting to validate the models and set the risk parameters used in the estimate of the overall value-at-risk against which capital must be held.

In July 1994,<sup>8</sup> the Basel Committee and the International Organization of Securities Commissions (IOSCO) produced a joint policy statement on the oversight of the risk management process by senior management; the measurement, control and reporting of risk exposures; and the internal controls and audits regarding risk management. In April 1995, following the collapse of Barings, the Basel Committee agreed to allow banks to use their own computer models to assess the risks arising from market volatility, rather than complying with standardized measures of volatility and risk for particular financial instruments. Also, for the first time, capital charges were required to cover commodities risks. The Committee later supported a number of steps to improve the quality of risk management. These included *stress tests* which examine the overall impact of a worst case scenario (such as a repeat of the 1987 stock market crash) on a bank's capital base. In addition, it supported the separation of the trading and settlement arms of banks' trading divisions.

There are still worries about the reliability of the computer models with regard to the more complex derivatives products and about the ability of regulators to evaluate the models. It is also feared that the use of the models will greatly reduce the transparency of financial markets because only banks and regulators will know the basis on which risks have been measured. Nonetheless, there seems little choice but to move further in the direction of the use of these models and this is, indeed, what the Basel Committee has decided to do.

In June 1999, the Basel Committee issued a proposal for a new capital adequacy framework that will replace the 1988 accord and be known as the Basel II Capital Accord. An extensive consultation process followed the publication of the new proposals and a second consultative paper was published in January 2001. Further consultations were needed with the

<sup>7</sup> Basel Committee on Banking Supervision (1993).

<sup>8</sup> Basel Committee on Banking Supervision (1994).



industry, however, and a third version was published. The present plan is for the new accord to operate from the end of 2006.

The new proposal incorporates many of the modifications to the original accord discussed above, notably the use of internal risk models to assess credit risk, the allowance for market risk and operational risk in the standardized calculation of the risk–asset ratio and the attempt to deal with the greater use of off-balance-sheet **asset securitization** by banks.

The new capital framework consists of three pillars:

- 1 minimum capital requirements, developing and expanding on the standardized rules set forth in the 1988 accord;
- 2 a supervisory review of an institution's capital adequacy and internal assessment process; and
- 3 the effective use of market discipline to strengthen disclosure and encourage safe and sound banking practices.

The three pillars are seen as part of a single package and are to be implemented together.

The new Capital Accord has been designed to improve the extent to which regulatory capital requirements reflect underlying risks and to address specifically the financial innovation that has occurred in recent years. It also aims to reward the improvements in risk measurement and control that have occurred and to provide incentives for these to continue.

Despite earlier rumours that the new accord would abandon the standardized formula for the risk-weighting of assets, this is being maintained. The definition of capital is not being modified and the minimum ratio of capital to risk-weighted assets including operational and market risks will remain at 8 per cent for total capital. Tier II capital will also continue to be limited to 100 per cent of Tier I capital. Under the new accord, the denominator of the minimum total capital ratio will consist of two parts:

- 1 the sum of all risk-weighted assets for credit risk; plus
- 2 12.5 times the sum of the capital charges for market risk and operational risk.

Assuming that a bank has \$875 of risk-weighted assets, a market risk capital charge of \$10 and an operational risk capital charge of \$20, the denominator of the total capital ratio would equal  $875 + [(10 + 20) \times 12.5]$  or \$1,250.<sup>9</sup>

The major difference from the 1988 accord lies in the greater emphasis on banks' own assessment of the risks to which they are exposed in order to make the overall approach more sensitive to different kinds and degrees of risk, allowing the incorporation of a much wider range of grades of assets. The use of a bank's internal risk model is known as an **internal ratings-based (IRB)** approach. This is to be introduced at two levels: foundation and advanced. A foundation IRB approach combines a significant external assessment of risk factors with elements of a bank's own risk assessment. Thus, banks that meet robust supervisory standards will make their own assessment of the probability of default associated with assets but estimates of additional risk factors, such as the loss incurred by the bank given a default and the expected exposure at default, will be made externally through the application of standardized supervisory estimates. The advanced IRB approach will be available to banks that meet even more rigorous supervisory standards and will allow more of the risk components to be estimated internally by the bank. However, the Committee has stopped short of permitting banks to calculate fully their capital requirements on the basis of their own portfolio credit risk models.

The Basel Committee, while acknowledging that asset securitization can be an efficient way for a bank to redistribute its credit risks to other banks and non-bank investors, has become increasingly worried by the way in which some banks have been using it to avoid maintaining a sufficient level of capital for their risk exposures. Thus, the Basel II accord develops standardized and IRB approaches for treating the explicit risks that traditional securitizations pose for banks.<sup>10</sup> The accord sets out operational, disclosure, and minimum capital requirements for securitizations.

The new accord does not aim to raise the total amount of regulatory capital required by banks but big banks with sophisticated risk management systems should be able to hold less capital and therefore

<sup>9</sup> This example is taken from Basel Committee on Banking Supervision (2001).

<sup>10</sup> A traditional securitization is defined in the new accord as involving the legal or economic transfer of assets or obligations by an originating institution to a third party, referred to as a 'special purpose vehicle' (SPV). An SPV issues asset-backed securities, which are claims against specific asset pools.

strengthen their competitive position. Other banks might have to hold more capital to reflect the wider range of risks than under the old rules and a more finely tuned assessment of the credit risk associated with different assets. The calculation of credit risk will also depend on how exposed a bank is to a single borrower or sector. Further, for the first time, there will be a requirement to hold capital to cover operating risk. Securitized loans will need more capital set aside than in the past unless the risk is completely transferred out of the bank. However, there will be greater allowance for factors that reduce risk, such as collateral or guarantees.

In order to counter concerns expressed in the banking industry over the implementation of the IRB approaches and the methods regulators will use to ensure that they are evenly applied between different banks and regulatory authorities, the new accord includes an extensive auditing system and enhanced requirements for disclosure. Another concern expressed by some bankers and regulators is that capital requirements have a pro-cyclical impact on bank lending – encouraging banks to lend when economies are doing well but discouraging loans in recessions, thus making economic cycles more pronounced. Under the old accord this happened because more loans become problematic during recessions and the valuation of banks' capital falls, requiring banks to set aside more regulatory capital to maintain the minimum capital asset ratio. Under the new proposals, this will continue to happen but, in addition, the more sensitive assessment of risk applied to assets will increase the calculation of risk-weighted assets. That is, in a recession the numerator will fall and the denominator rise, making it more difficult for banks to make new loans. There is some evidence that this had a serious impact on the US economy in the early 1990s, especially in making it difficult for small and medium-sized companies without access to the capital markets to raise funds.

The reverse happens in booms. Credit-risk models can attempt to take this into account but there is doubt that they can do it adequately. These worries need to be balanced against the view that the new accord will remove distortions from the regulatory framework and, by so doing, should encourage lending to sound borrowers and discourage lending to bad ones.

To ensure that risks within entire banking groups are considered, the Basel II Capital Accord is to be extended on a consolidated basis to holding companies of banking groups.

## 25.5 The regulation of universal banking in the EU

We have discussed EU financial regulation in Chapter 21. We noted there that the European Commission has followed developments in the Basel Accord. For example, in May 1996 it proposed the amendment of the *First Banking Directive*, the *Bank Solvency Ratio Directive* and the *Capital Adequacy Directive* to change supervisory rules for banks to introduce more sophisticated capital requirements for default risks involved in OTC derivatives in line with the Basel Committee changes. The *Bank Solvency Ratio Directive* was also amended in 1996 to encourage bilateral netting agreements, allowing the offsetting of mutual claims and liabilities from OTC derivatives contracts.

Here, however, we are concerned with a particular problem related to the regulation of banking that arose in the EU because of the different banking traditions of its members. We have seen that a significant proportion of German banks engaged in a wide range of securities operations as well as in the narrow banking activities of deposit taking and making commercial loans. Thus, when the European Commission put forward its proposals for the regulation of EU-wide banking in the *Second Banking Coordination Directive* of 1989, regulatory authorities in a member state were allowed to grant their home banks a licence to offer a wide variety of services throughout all member states (see Box 21.1 for the list of these activities).

In its attempt to ensure the stability of the EU banking system, the *Second Banking Directive* and the *Bank Solvency Ratio Directive* of 1989 adopted the Basel capital adequacy ratios discussed above. This, however, left non-bank securities houses, notably those in the UK, unregulated at EU level – neither guaranteed a single passport to trade freely across the EU nor subject to capital adequacy and solvency rules. The former left the British financial industry at a serious competitive disadvantage relative to that of Germany and made the *Investment Services Directive* which came into force in June 1992 essential, extending the single passport principle to non-bank investment firms generally. The latter then placed German banks and their subsidiaries engaged in securities trading at a competitive disadvantage relative to the British non-bank securities firms. To overcome this, the *Capital Adequacy Directive* (CAD) of 1993 had to apply to both investment firms and to the securities activities of banks.

But the argument for official protection of investment firms is less clear than for banks. Dale (1996) advances several reasons for this:

- Investors are typically not small market agents who can be assumed to have little knowledge; this makes the argument that consumer protection is needed less strong.
- In any case consumer protection can be provided in other ways, through, for example, requiring investment houses to segregate investors' cash and securities in special accounts.
- It is argued that the principal risk for securities houses is market risk whereas for banks it is default risk.
- Investment firms are well placed because of their liquid assets to arrange secured financing which does not give rise to full default risk exposure.
- The assets of securities houses consist largely of marketable securities, making them much less vulnerable than banks to contagious liquidity and solvency crises. Thus, there is much less chance than in the case of banks that they will cause systemic problems and their associated social costs.

Systemic problems may, of course, arise for banks within a financial market regime characterized by increasing integration of banking and securities business to the extent that banks engage in securities business directly or through a subsidiary or lend to investment firms. This, however, does not provide a justification for the regulation of separate investment firms. Further, if both banks and securities houses are to be regulated, Dale argues that different techniques should be applied since they have different objectives. The emphasis should be on solvency for banks but on liquidity for securities houses. This should, in turn, mean that different measurements of capital should be used for the purpose of calculating capital adequacy ratios: the capital of banks should be permanent to support the institution as a going concern; while that for securities houses may only need to be temporary because of their fluctuating need for capital resources and because of the ease with which they can respond to problems by scaling down their activities. Again, there may be less need for consolidated supervision in the case of securities houses because they are thought to be less vulnerable than banks to cross-infection from a troubled parent or affiliate. Finally, investment firms do not need access to a lender of last resort.

The solution chosen by the EU in the *Capital Adequacy Directive* was that where banks engage either directly or indirectly in securities activities or trading, those activities should be subject to a capital adequacy regime separate from that of the banking business. This approach is known as the **trading book model** since the bank is being required, for the purposes of capital adequacy, to keep its trading business separate from its banking business. The distinction between the trading book and the banking book of banks is that the *trading book* covers trading for short-term gain, while the *banking book* relates to longer-term investment or hedging. Only certain types of instrument can be held in the trading book but some types of instrument can be held in either the trading book or the banking book depending on the purpose for which they are being held. A single instrument cannot be held simultaneously in both books. Items held in the banking book are subject to the risk-weighting scheme described above. Items in the trading book are subject to capital charges. The size of these capital charges varies with the nature of the risk. The capital charges for all trading book items are added together and a measure known as Notional Risk Weighted Assets is produced. This allows the capital adequacy requirement for both the banking and trading books to be expressed as a single unit.

The approach of the *Capital Adequacy Directive* ensures competitive equality between the securities arms of universal banks and separate investment firms, but in so doing it assumes that banks engaged in securities business can genuinely prevent problems in one part of its activities from spreading to the other. In Dale's view, the approach puts competitive equality before that of the soundness and stability of the system.

## 25.6 Summary

The financial services industry has always been heavily regulated. This has been particularly true of banking because of the vulnerability of banks to a loss of public confidence. The collapse of a single bank arouses fears that it might be contagious, causing problems for the banking industry as a whole and hence for the provision of the economy's medium of exchange. Important consumer protection issues also arise in the failure of banks.

The case for regulation is based upon the existence of various types of market failure, notably the existence of asymmetric information, while strong arguments against regulation are centred on the ideas of moral hazard, agency capture and compliance costs. Regulation increases the costs of entry and exit for new firms and thus may inhibit competition. In some circumstances, regulation may even increase the instability of an industry. A compromise position is to support regulation but to argue in favour of self-regulation on the grounds that practitioners have an interest in maintaining the reputation of their industry and are in the best position to understand the impact of regulation

on the industry. Nonetheless, several problems have emerged in self-regulatory schemes.

Financial markets have been greatly influenced by globalization and financial innovation, both of which have caused particular problems for regulators. Globalization has led to the need for coordination of activities among bank supervisors and for the development of common regulatory standards to avoid competitive laxity among the supervising authorities. As the EU financial services directives have shown, however, it is not easy to devise common regulatory standards among countries with differently organized financial systems.

### Key concepts in this chapter

Asymmetric information  
 Deregulation  
 Self-regulation  
 Competitive laxity  
 Trading book model  
 Financial Services Authority (FSA)

Agency capture  
 Compliance costs  
 Netting agreements  
 Internal ratings-based approaches (IRB)  
 Risk–asset ratios  
 Asset securitization

### Questions and problems

- 1 Why might the existence of asymmetric information lead bankers to be conservative in their lending policies?
- 2 How does asymmetric information produce a role for credit-rating agencies? What dangers might there be in the financial services industry becoming too dependent on credit-rating agencies?
- 3 How important is moral hazard as a determinant of people's behaviour? Provide examples of moral hazard related both to everyday life and to the financial services industry.
- 4 Under what circumstances might regulation decrease rather than increase the stability of an industry?
- 5 Discuss the view that self-regulation cannot cope with the problem that what is good for the industry as a whole may not be good for individual practitioners.
- 6 Why has globalization of the financial services industry made the problems faced by regulators more difficult?
- 7 Explain the basis of the distinction between the types of capital in the Basel Concordat.
- 8 Why is it thought that simple capital adequacy ratios are insufficient as a basis for supervising the activities of firms engaged in securities trading?
- 9 What aspects of the regulatory problem were highlighted by the collapse of Baring's Bank in 1995?

## Further reading

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D Ware, *Basic Principles of Bank Supervision* (Handbook No. 7, Bank of England Centre for Central Bank Studies) – available on [www.bankofengland.co.uk](http://www.bankofengland.co.uk)

## Websites

[www.bankofengland.co.uk](http://www.bankofengland.co.uk)

[www.bis.org](http://www.bis.org)

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# Financial market efficiency

*What you will learn in this chapter:*

- The meanings of the term 'efficiency' when applied to financial markets
- The forces tending to make financial markets efficient
- The distinctions between various forms of the Efficient Market Hypothesis
- The implications which follow from financial market efficiency
- Some ways in which efficiency can be tested

## 26.1 Introduction

It is perhaps appropriate that the final chapter of this book should take us back to where we began. In Chapter 1 we explained that a fundamental purpose of a financial system is to help funds to move from those with a financial surplus to those with a financial deficit. In Section 1.5 we discussed the many benefits that would flow from this, amongst which should be a higher level of saving and investing and a higher rate of economic growth.

These are large potential benefits and so it seems reasonable to ask questions about the efficiency with which financial systems work. One such question we met in Chapter 2 when we saw that some critics feel that the UK and US so-called market-based financial systems encourage ‘short-termism’. Understandably, therefore, a substantial amount of effort has gone into investigating financial market efficiency.

In these investigations ‘efficiency’ has been defined quite narrowly. In saying that any market is efficient, one could mean any one of several things. Firstly, one might mean that the market is **operationally efficient**. This would mean that trading is carried out quickly, reliably, and at minimum cost. If one were interested in this kind of efficiency, one might look back at the chapters in Part 2 of this book where we saw that most financial systems have very high levels of activity and turnover in relation to the net flows of funds actually channelled between lenders and borrowers. On the other hand, one might ask whether a market was **allocationally efficient**. This would mean that the resources being allocated, ‘funds’ in the present case, were going to their most productive use. If one were interested in this kind of efficiency one would certainly want to know whether firms with long-term projects found funds unreasonably expensive to raise compared with firms with short-term projects (the short-termism hypothesis) or whether firms with a long-established record of profit growth found funds very expensive while firms with no track record could raise funds easily. Finally, one might ask whether a market was **informationally efficient** in the sense that prices were based on the best information available. If one were interested in this kind of efficiency, one would want to see whether it was possible to seek out

information that enabled one to make better predictions of future prices than those that the market made for itself. Notice that in order for a market to be allocationally efficient, it must also be informationally efficient since allocation decisions are made in response to prices. Thus prices must be ‘correct’ in the sense that they incorporate all information. Indeed, allocational efficiency imposes an even stricter condition which is that the information in question must relate wholly and exclusively to ‘fundamentals’. We shall see the significance of this in a moment.

In practice, the financial market literature is concerned with **pricing efficiency**. ‘Efficient’, when applied to financial markets, means quite simply that:

security prices fully reflect all relevant information.

Since we know that, all other things given, the price fixes the return on assets and vice versa, it is immaterial whether we write the definition in terms of prices or rates of return.

Notice that, as we have written it, the definition requires that prices reflect all **relevant information**. But this then raises a further question. ‘Relevant to what?’ Well, relevant to the pricing of securities, obviously. But we already know that security prices could be driven by a range of quite different factors. The best place to look is in Sections 11.4 and 11.5. In Section 11.4 we introduced models of asset valuation involving a risk-adjusted discount rate, the current income payment and an earnings forecast. These, we stressed at some length, are often described as an asset’s fundamentals. On the other hand, we said in Section 11.5 that asset prices *might* be driven by other things, including the belief, in a boom for example, that there is always someone prepared to pay a higher price whatever the fundamentals may be (the ‘bigger fool’ hypothesis). The definition that we have given of an efficient financial market, even if we add the word ‘relevant’, is strictly agnostic as to what information it is that should be incorporated. As we noted above, if we want markets to be allocatively efficient, we want them to be informationally efficient but we also need to know that the relevant information that is playing its part is information about the asset’s fundamentals, since it is these fundamentals that are linked to productivity and social rates of return.<sup>1</sup> The situation where markets are informationally

<sup>1</sup> If this has been forgotten or remains obscure, a glance at Section 11.4 might be useful.

efficient *and* the information involved relates to fundamentals is described by Elton and Gruber (1995) as **market rationality**. We shall follow this practice but it is fraught with danger because the lesser question of whether markets are informationally efficient (regardless of the information source) hinges upon whether traders form their expectations *rationally*. Clearly, these are references to two quite different ‘rationalities’: that of agents in using information to form expectations, and that of markets in choosing a pricing model which relies only on fundamentals. We must be very careful not to confuse the two. With this in mind, we shall take the issue of informational efficiency first and turn to market rationality at the end.

Thus, in the next section we set out the **efficient market hypothesis (EMH)** and we distinguish between different ‘levels’ at which it may operate. In Section 26.3 we look at the implications of the hypothesis and in Section 26.4 at ways of testing the hypothesis and at some of the evidence. In Section 26.5 we turn to the question of market rationality, looking at the implications and the evidence in the one section. In Section 26.6 we provide a brief introduction to a body of work which has developed in recent years under the heading of ‘**behavioural finance**’ and which is very critical of the EMH. As usual, the final section provides a summary.

## 26.2 The efficient market hypothesis

As we noted above, the hypothesis states that the current price of securities incorporates all relevant information or, equivalently, that securities yield rates of return which incorporate all available information.

Looking at rates of return first, we know from Equation 11.3 that the total return on a security is the sum of its dividend yield (dividend divided by price) plus any capital appreciation (or loss). Thus, where  $K$  is the rate of return,  $P_0$  is the purchase price,  $D_1$  is the dividend paid during the holding period and  $g$  is the rate of capital appreciation:

$$K = D_1/P_0 + g \quad (26.1)$$

Recall then that the rate of capital appreciation is merely the change in price divided by the price paid, then:

$$K = \frac{D_1}{P_0} + \frac{P_1 - P_0}{P_0} \quad (26.2)$$

where  $P_1$  is the price in the next period.

Imagine a security, a company share say, where the next dividend,  $D_1$ , is known.<sup>2</sup> Then the rate of return,  $\hat{K}$ , *expected* at the beginning of the period, is uncertain by virtue of the fact that we do not know, but can only form *expectations of*,  $P_1$ . Thus:

$$\hat{K} = \frac{P_1 - P_0 + D_1}{P_0} \quad (26.3)$$

Since efficient market theory argues that people use all available information in forming expectations of future events, then  $\hat{K}$  is an **optimal forecast** of  $K$ , and since making an optimal forecast of  $K$  requires that we make an optimal forecast of  $P_1$ , then  $\hat{P}_1$  must be an optimal forecast of  $P_1$ . Thus:

$$\hat{K} = K^{of} \text{ and } \hat{P}_1 = P_1^{of}$$

where the superscript *of* stands for optimal forecast.

The efficient market hypothesis is persuasive at first sight since it is merely an application of the basic economic proposition that people act as rational maximizers.<sup>3</sup> We have made the assumption throughout this book that agents are risk-averse wealth maximizers. If they do not form expectations of the future in the optimal way, then they will be forgoing wealth maximizing opportunities: ‘irrational’ expectations are costly. Suppose, for example, that when directors sell shares in their own companies this is generally followed by announcements of lower than expected earnings. We know (from Chapter 17) that lower than expected earnings will cause a share’s price to fall and the holders of that share will suffer a reduction in wealth. However, if there is a regular observable pattern of directors’ sales followed by poor earnings announcements, agents who are genuinely wealth maximizers and genuinely rational will seek out this information<sup>4</sup> and incorporate it into what they think shares are worth. Thus a director’s disposal will

<sup>2</sup> In many cases of course it will not be known but this makes little difference to the analysis. We should simply have to assume that the forecasts of  $D_1$  also use all available information.

<sup>3</sup> The efficient market hypothesis is just one application of the ‘theory of rational expectations’ first set out in 1961 by John Muth.

<sup>4</sup> The Saturday issue of the *Financial Times* lists the major sales (and purchases) by directors of shares in their own company.



itself act as a signal to sell as well-informed ('rational') investors try to avoid a capital loss, and the subsequent reduced earnings announcement will have no effect on the price, which will already have incorporated this information.

Another way of looking at the forces pushing agents to make optimum forecasts based on all information is to think of 'equilibrium' prices or returns. By 'equilibrium' we mean those prices which produce rates of return that are just equal to what people require (again, for the moment we say nothing about the origin of this valuation). Let us call the equilibrium return<sup>5</sup>  $K^*$  and the corresponding equilibrium price  $P^*$ . Then it follows that if an optimal forecast of  $K$  exceeds  $\bar{K}$ , informed investors will wish to buy the corresponding asset in order to benefit from the abnormally high return. Buying the share will of course cause the price to rise and the forecast return to fall until the optimal forecast just equals the required or equilibrium return. Conversely, if the optimal forecast of returns is that they are below what investors require, then well-informed investors again will try to benefit, this time trying to avoid a capital loss, by selling the corresponding asset. Its price will fall until, again, the optimal forecast return rises to that required by the market. Using our symbols, we can summarize:

$$\text{If } K^{of} > \bar{K} \text{ } P \uparrow \rightarrow K^{of} \downarrow$$

$$\text{If } K^{of} < \bar{K} \text{ } P \downarrow \rightarrow K^{of} \uparrow$$

We turn now to what the EMH does *not* imply. This is important since finding that the implications of the EMH are not confirmed in practice is one way of casting doubt upon it. But if the implications themselves are incorrect, this rejection will be unjustified.

Firstly, *the EMH does not say that prices will always be correct*. It merely says that the expectations that people form are the best possible forecasts in the prevailing situation. Thus, it will frequently be the case that our forecast of price in the next period,  $\hat{P}_1$ , will be:

$$\hat{P}_1 = P_1 + \varepsilon \quad (26.4)$$

where  $\varepsilon$  is an error term. What the EMH *does* say is that there is nothing in the behaviour of the error term which enables us to improve our forecast. If,

for example,  $\varepsilon$  were always positive this would mean that our forecast of the price was always too high. In these circumstances, we could improve the forecast by adjusting it downwards. In this example, the error term is *systematically* positive. In fact, we can always improve the forecast if the error term behaves in any way that suggests a systematic connection with the forecast. We simply have to find out how the error term behaves and make the appropriate adjustment. This leads to an important conclusion which is best stated formally. If our forecasts are to be *optimal* forecasts (and the EMH holds) then it must be the case that the forecast errors have a mean value of zero and that they have zero covariance with the forecast. Thus, a market can make forecast errors of future prices (and yields) and still be efficient, provided that there was no way of doing anything better. Box 26.2 provides an interesting example of the UK money markets failing to make correct forecasts of movements in short-term interest rates; notice, however, that the errors were soon corrected!

Secondly, *the EMH does not require people to use all information in forming their expectations*. This would be realistic only if information were costless. We noted above that one of the forces that drives markets towards efficiency is the motivation of traders in those markets. Their incentive to trade efficiently is the desire not to forgo profitable opportunities. But an opportunity in which it costs more to acquire the information than could possibly be lost by making a second-best forecast is not a profitable one. Since information costs are generally positive, we should better say that the EMH implies that prices reflect all that information whose marginal cost is less than the marginal benefit from incorporating it in the decision.

Lastly, *the EMH does not require everyone to behave as well-informed, rational, risk-averse wealth maximizers*. The fact that we can always find some trader somewhere who makes a 'silly' or at least highly questionable decision does not disprove the EMH. Market prices are determined by the actions of the majority. Provided that there numerous well-informed traders looking for unexploited profit opportunities, market prices will be driven, by a process known as arbitrage, to the point where they reflect all profitable information.

<sup>5</sup> Defined as the required rate of return,  $K^*$  is simply equivalent to  $\bar{K}$  which was the symbol we used in Chapters 11 and 17.

Since Fama (1970) it has been standard practice to identify three *levels* at which the EMH can be said to hold,<sup>6</sup> where each level is distinguished by the stringency of the demands which it places on the information to be incorporated in the price. The first is the **weak** form, in which all information contained in the past behaviour of the asset's price is included. This amounts to saying that studying past trends tells us nothing about the next price movement because any useful information in those past trends has already been exploited. The price has already moved. In the **semi-strong** form, all publicly available information is incorporated in the current price. This amounts to saying that studying current publicly available information – about the growth of retail sales or a firm's latest earnings, for example – is no guide to future movements and for the same reason. Any information that could be extracted is already in the price. In the **strong** form, all information – public and private – is incorporated. This makes the most stringent demands on information since it says that even the information available only to those closely concerned with the firms has already been taken up and incorporated in the price.

This distinction between 'levels' of the EMH is important. Firstly, in the next section, we shall see that each level of the EMH has different implications for financial markets and investors' strategies, and in Section 26.4 we shall see that different empirical tests are required for each level.

### 26.3 Implications of the EMH

The main or the fundamental implication of the EMH is that if markets are efficient then it is impossible for investors to exploit information in order to earn excess returns over a sustained period of time. 'Excess' here means in excess of the equilibrium or required rate of return, howsoever that is determined. In these circumstances it is sometimes said that the process determining security prices makes for a **fair game**. Based on the information available at time,  $t$ , an investor makes an estimate of what an asset's return will be between  $t$  and  $t + 1$  (or between 0 and 1 in our examples above). As we saw in the last

section, an investor will compare this expectation with the equilibrium or required return for an asset of that type. The estimate may be higher or lower than equilibrium and the investor will accordingly buy or sell. Sometimes the eventual outturn will show that the return was correctly estimated; sometimes it will show the estimate was too high and sometimes too low. If prices are determined by a fair game process, there should be no relationship between the investor's estimates of deviations from the required return and the actual deviation from the required return as it turns out to be at  $t + 1$ . As we have said all along, systematic errors can be corrected and the EMH says that, in general, they will be.

It is sometimes said that if the EMH holds then returns follow a *random walk*. As we shall see in a moment, the **random walk model** is a restricted version of the fair game model, but the origin is the same. If past information is already incorporated in the price, the only information that can cause a price change is *news*, and news by its nature is unpredictable. Sometimes the news will be good and sometimes it will be bad. Prices (or returns) which respond to this news will thus follow a random pattern. Strictly speaking, a random pattern of returns means that each return is independent of the one before. Furthermore, the returns are identically distributed over time: they are drawn, in other words, from a constant distribution of returns. This condition need not apply in the fair game model and indeed for many shares one would not expect it. A firm with a large investment programme aimed at changing its core business, for example, may be entering markets with a higher risk/return combination. In this situation, successive returns will not be independent but will be increasing. Even so, the information about the firm's change of direction cannot be used to earn excess returns since its risk is also increasing and the returns will follow a fair game process even though they do not follow a random walk.

We shall see shortly that there are all sorts of practical, subsidiary implications that follow from the fundamental point that information cannot be used to extract excess returns, but first we need to note that each of the three forms of the EMH carry this implication for different types of information. We consider the implications of each form in turn.

<sup>6</sup> The definition of each was modified slightly in a more recent paper (Fama, 1991).

Firstly, if the market is weak-form efficient then it will be impossible to earn consistent excess returns by using any information extracted from the past behaviour of asset returns (or prices). Imagine the case of a share whose price and dividends have increased steadily over the past few years, giving a consistent rate of return. *If* there is any information in this trend that suggests that it will continue, then this is already built into the price that people are prepared to pay for it. Equally, any useful information that might be conveyed by the price of a share which recently declined sharply and is now recovering is already incorporated in today's price. Investors could, if they wished, construct portfolios based on shares of either type. Thus a naive, risk-averse investor, believing that the past is a good guide to the future, might be tempted to invest in shares of the first type, turning his or her back on shares whose returns may fall again shortly. However, the message of the weak-form EMH is that neither strategy, investing in 'steady growth' or in 'recovery' shares simply on the evidence of past price movements, will yield a return which is consistently above that required by the market for shares of each risk class.

Secondly, if the market is semi-strong-form efficient, then it is impossible to earn excess returns from the exploitation of current, publicly available information. According to this view, the investor who studies firms' announcements about earnings, sales, new products, changes in capital structure and so on, will be no more able to buy shares at a price which yields excess returns than s/he would if s/he bought those shares that gave him or her the desired combination of risk and return at any time that suited him or her. The effect of any announcements that have been made is already incorporated in the price. If it were possible to devise 'rules' or 'clues' that allowed announcements to be anticipated, then these rules and clues would also be exploited in order to anticipate the announcement and again the effect on the price would already have occurred by the time our investor could act. The same goes for market-wide information. We know, for example, that a change in interest rates causes bond prices to change in the opposite direction. But bond prices do not wait for the change in interest rates to occur. This is because changes in rates are to some degree predictable on the basis of what we know the government's objectives to be, we know the model of the economy that it is using in order to achieve those objectives and we can see the

present direction of the economy. Thus, if we know that the government is following a strict money supply rule (as it did in the UK from 1980 to 1985) then the rapid growth of bank lending becomes a leading indicator of interest changes and so bond prices responded to information about bank credit. In this situation, the semi-strong version of the EMH says that no excess returns can be made from studying bank lending trends since any information which is known to be interest relevant will already be incorporated in bond prices.

In its strong form, the EMH says that even information available only to privileged groups of investors is incorporated in the price. Consequently, this information is also unhelpful as a source of excess returns. This is clearly the most demanding of the three forms of the EMH and looks implausible at first glance. It seems obvious to most people that someone working in a large corporation, for example, could become aware of profitable information even before the directors. Imagine a drug or biotechnology company whose profits are extremely sensitive to scientific breakthroughs. Common sense suggests that it must be possible for researchers to become aware of a major breakthrough before this is known to managers who cannot understand the research data until it is interpreted. Someone in such a position must surely be able to earn excess returns. In most countries s/he will also earn a spell in gaol since **insider trading**, trading on information available only to those inside the firm, is illegal. Undoubtedly it is possible to earn excess returns by breaking the law, in financial markets just as much as in other walks of life. The question addressed by the strong form of the EMH is whether this can be done by legally exploiting information available only to the few. In practice, as we shall see shortly, this usually means 'is it possible for professional analysts to earn excess returns by studying the characteristics and behaviour of individual firms?'

Notice that what is at issue in all these forms of the EMH is the speed with which the particular category of information is incorporated into the price. If markets are informationally efficient, it is the speed with which information (of whatever category) is used that prevents investors from earning excess returns. The possibility that markets might be so efficient that investors cannot profit from exploiting information of any kind itself has further implications. We have space to discuss only limited examples.

If the EMH says that it is impossible for investors to exploit information so as to earn excess returns for any sustained period of time, then this suggests that there is little point in expending effort in searching for **bargains**. There are no bargains. There will be ‘cheap’ securities and ‘expensive’ ones (that is, securities with high yields and low yields respectively) but this will be because of the degree of risk that attaches to them or to some other characteristic(s) on which the market bases its valuation. ‘Bargains’ are anomalies. But if the market is informationally efficient, all relevant information is incorporated in the price by the time the investor comes to buy it. In these circumstances, the best investment strategy is to buy a portfolio of shares and to hold them for a long period in order to minimize transaction costs. A portfolio (rather than a single asset) is necessary in order to diversify risk and it is tempting to say that the investor should assemble a portfolio of shares that matches his or her risk/return preferences. But if we remember the discussion in Section 8.5, we recall that there is at least a theoretical case that the ‘best’ combination of risk and return comes from holding part of one’s wealth in a portfolio that replicates the whole market of risky assets and allocating the rest to a risk-free asset. In practice, this reasoning gives rise to the **index tracker funds** marketed by most unit trust or mutual investment funds. Investors’ funds are used to buy units in a portfolio of shares which matches, if not the whole market portfolio, at least the portfolio of shares that make up some representative index. Having assembled that portfolio, the fund managers have little to do but adjust the portfolio on the comparatively rare occasions that the composition of the index changes. In other words, they pursue a ‘buy and hold’ strategy on behalf of investors. Since this absorbs little management time and effort, compared with all the research and analysis that goes into trying to pick ‘winners’, charges on tracker funds are much lower than on actively managed funds. In the UK at least, investors’ returns from index tracker funds have been in the top quartile of unit trusts ranked by return over the last ten years. This performance, combined with low charges, has made them a popular recommendation from consumer organizations, though they remain a small proportion of the whole range of funds available. One might say that their success is some evidence in favour of the EMH, but the investing public appears to remain sceptical and is prepared to pay for specialist advice which it thinks can beat the market. Box 26.1 suggests that the picture is rather similar in the USA.

If the EMH calls into question the wisdom of investors trying to select assets that beat the market, it also calls into question the wisdom of paying for specialist advice in order to make the selection. If the market is strong-form efficient and prices incorporate *all* relevant information, regardless of its source, then *no one* has an informational advantage and so paying for advice is a waste of money. However, if the market is only semi-strong efficient, then it might be possible that professional research, conducted by analysts who concentrate on just one sector of the market or just one narrowly defined set of assets, *might* succeed in uncovering bargains. The question then for investors is ‘does the superior information generate excess returns, greater than the cost of acquiring it?’ As we shall see in the next section, one of the tests of the strong-form EMH involves looking at the returns to investors generated by actively managed mutual funds *after* their charges have been deducted. On the face of it, financial markets throughout the world appear to accept some degree of informational inefficiency. If the market were strong-form efficient there could be no superior alternative to ‘buy and hold’. However, we saw in Chapter 3 that turnover figures for securities of all kinds were many times greater than the net acquisitions made by investment institutions on behalf of investors. Securities markets are very active

#### More from the web The efficient market hypothesis

For an issue which is so controversial and has dominated finance for a generation, it is not surprising that there are hundreds of websites devoted to it, or featuring it as one issue among many. Fortunately, many of these sites are interlinked so that if we only highlight two, that will give access to 20 or more. If that is not sufficient, just type ‘efficient markets’ into a search engine – and prepare to be swamped.

Two sites that we have referred to elsewhere in this book are:

[www.investopedia.com/university/concepts](http://www.investopedia.com/university/concepts)

Amongst the concepts listed is the EMH, which is clearly explained with additional reading and links to other sites.

[www.investorhome.com/emh.htm](http://www.investorhome.com/emh.htm) takes you directly to a rather more informal discussion of the EMH.

Again there are links to other sites and the major contributors to the debate.

**Box 26.1 US index tracker funds**

The following report is taken from the *Financial Times*, 11 January 1997. Its central theme is that the majority of funds failed to match the S and P 500 index in 1996, in spite of their expert management. By comparison, tracker funds did

well. Notice also their small role in the mutual funds market and their low charges. The article ends by saying that specialist funds under active management *can* sometimes do better. But the question posed by the EMH is 'can they do it *consistently*?'

Wall Street

**FT**

## Mutuals manage to miss the track

Beating the index proves too difficult for most. **John Authers** examines why

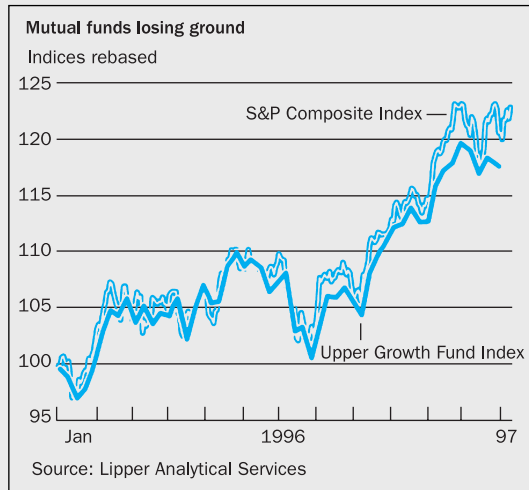
American mutual funds, the equivalent of unit trusts, which now manage \$3,500bn on behalf of small investors, seem to be missing the track. As analysts started to pick through the records, and identify the winners and losers from 1996 – a year when the industry attracted more funds than ever before – one fact became painfully clear: the vast majority of mutuals, in spite of being paid for their expert investment management, failed even to match the market index.

According to Morningstar of Chicago, one of the nation's leading investment analysts, the average US equity growth fund returned 18.82 per cent, while the average return for 'aggressive growth' funds was only 13.67. The return on the Standard & Poor's 500 index, accepted generally as the fairest benchmark of Wall Street's performance, was 22.95 per cent.

Only one of the 10 biggest funds, in terms of the total assets they manage, successfully beat the index last year. Most tellingly, the diversified sector which performed best had funds which made no attempt to beat the market. According to Lipper Analytical Services, another leading analyst, funds in the S&P 500 Index sector, which merely attempt to replicate the performance of the index, gained 22.3 per cent.

These funds have a higher proportion of large companies in their portfolios than most of their rivals, which goes some way to explaining their success in a year in which the market rally was led by blue chips.

Unfortunately, underperforming the index seems to be a regular habit. According to Lipper, about 25 per cent



of diversified US equity funds managed to match the S&P, which meant the industry had done significantly better than in 1995 when only about 16 per cent managed to match it.

Small investors are now moving towards conservatively managed funds. It seems that the fund to attract the most new net cash last year (final figures are not yet available) was Vanguard Index 500, which has total net assets of \$30.31bn. This makes it the third largest of all mutual funds. It is also by far the most successful of the 56 index tracker funds which, in total, have \$65bn under management.

A comparative figure from the UK puts their staggering commercial success into context. Last year, the largest UK index unit trust, run by Legal & General was worth £422m, or about \$715m at present exchange rates.

Vanguard is a name that could become much more

familiar. It is selling a lot of mutual funds; new investments exceeded redemptions by \$26.1bn in the 11 months to November last year, putting it comfortably ahead of everyone else in the industry. And it embodies a realistic approach to investment which is becoming increasingly popular.

John Bogle, Vanguard's founder, once tracked the performance of funds after they had performed well enough to appear on the 'honour roll' published by *Forbes* magazine. They underperformed both the market and the average for the industry thereafter, the message being that successful active management cannot be expected to persist.

Vanguard makes a policy of boasting more about its costs than its investment performance. There are no sales charges on its index fund and the annual management charge last year was 0.2 per cent of assets.

It puts its philosophy this way: 'If you don't have a high return, you either have to lower your costs or increase your risks. Costs are something you can control much more than risks.'

Are there problems with passive management? An obvious complaint is that trackers look good when they chase the index up, but less so when they follow it straight back down again. It is also harder to replicate exactly the performance of an index than it might seem. All the S&P funds came fairly close to target last year, but the total range in performance was from 23.06 to 20.24 per cent – a difference that would look more significant in a bad year.

Last year's data shows that picking a sector, and getting it right, still pays dividends. Natural resources funds gained 32.74 per cent, while real estate funds gained 30.8 per cent. And if a fund outperforms the index for a few years, compound interest gives it a spectacular return.

Take Fidelity's much abused Magellan, for example. It had a terrible year in 1996, gaining only 11.69 per cent. But it is still the nation's biggest fund and it still has the best performance over the past 20 years. Vanguard's index fund grew by 1,311 per cent in that period – an admirable backbone to any portfolio. But Magellan gained 7,445 per cent.

**Dow Jones Ind Average**

Monday	6567.18 + 23.09
Tuesday	6600.66 + 33.48
Wednesday	6549.48 – 51.18
Thursday	6625.67 + 76.19
Friday	6703.79 + 78.12

and this must, to some degree, represent a view that superior returns can be made by moving, and moving frequently, between assets. Furthermore, investors clearly are prepared to pay for professional advice and those that offer it can earn substantial salaries. In January 1997, the UK media were briefly fascinated by a story of a female fund manager who had been sacked from a post in which she had reportedly been earning over £1m per annum. More interestingly, from our point of view, however, is the background to the story in which it was alleged by her employers that she had been preparing to move to a rival firm and had been encouraging selected colleagues to move with her. The extensive commentary which accompanied these events made it clear that investment institutions supported an active transfer market for successful and very highly paid fund managers.

The fact that some professionals are particularly sought after for their apparent ability to beat the market seems to suggest that the market is to some degree at least inefficient. Indeed, one might ask whether the mere existence of so much financial analysis and financial advice is evidence of inefficiency. If an efficient market is one in which investors cannot beat the returns from a 'buy and hold' strategy, then devoting considerable resources to looking for bargains seems pointless. But we need to be careful with this evidence. Firstly, the fact that a lot of skilled work goes into researching firm-specific and whole market conditions is one of the reasons why financial markets possess whatever informational efficiency they do possess. There is a paradox here. If the market is efficient, the research is unnecessary but without the research the market will not be efficient. Secondly, remember that market efficiency does not require that *all* investors make the best use of available information. Many will; these are the 'information traders' whose role we discussed in Section 16.6. But we also identified 'noise traders', those who buy and sell in response to their own view of how a security's price is going to move. Noise traders, whether they realize it or not, behave *as if* the market is inefficient and provide a ready market for advice, tips and so forth.

The EMH has implications for corporate finance as well as private investment. Recall (from Chapter 17) that the market value of a firm is the market value of the securities in issue. Furthermore, the dividends paid on equities and the interest paid on any bonds are components of the firm's cost of capital. If, as we said above, there are no bargains for shareholders – prices

accurately reflect the market's valuation of the securities' characteristics – then there is nothing that firms can do to influence the price of their own bonds and shares. This could be important in a variety of contexts. In a contested takeover, for example, it is advantageous to both sides to maximize the value of their shares since, for the target, this makes it more expensive for the predator to buy, while, for the predator, a high share price means that fewer of its own shares have to be offered in any deal with the shareholders of the target company. A firm wishing to raise capital via a new issue of shares will also find a high share price advantageous since, for the current level of dividend payments, each new share brings in more funds than would be the case if the price were low: a high share price means a low cost of capital. In both these (and other) cases, firms might be tempted to manipulate information in order to raise their share price – bringing forward 'good' information and suppressing 'bad', for example. But if the market is strong-form efficient this should not work. There is no inside information which only the firm can exploit. Any 'news' that it tries to create is already in the price. The market must be only semi-strong-form efficient if this type of operation is to succeed. So far as one can judge from their behaviour, firms are divided in their views. Many bitterly contested takeovers are fought out with expensive public relations techniques designed to influence investors' perceptions of firms' value by suggesting that the share price does not incorporate all relevant information. On the other hand, the infamous Guinness takeover battle for the Distillers company resulted in the Guinness chairman and associates being sentenced to prison for organizing an illegal share support operation. Essentially, this involved paying inducements to selected investors to encourage them to buy Guinness shares in the hope that this would push up the price and so strengthen Guinness's position. This suggests a belief on the part of the Guinness side that the market was so efficient that there was nothing they could do to strengthen their position by manipulating information. The only way to move their shares' price was to pay others to buy them.

## 26.4 Testing the EMH

In its weakest form, the EMH says that returns (or price changes) cannot be predicted from information about the past behaviour of returns (or prices). As we

saw in the last section, this amounts to saying that events in the next time period are unrelated to those in the last. Tests of the weak form of the EMH therefore consist of tests for the absence of correlation between returns (or prices) in successive time periods. Two commonly used tests which do this directly are (regression) tests for **serial correlation** and **'runs' tests**. A less direct approach is to see whether traders can make abnormal profits by adopting a trading rule based on past data patterns. We look at each in turn.

### 26.4.1 Regression tests for serial correlation

'Serial correlation' simply means that successive values of a variable are related. Thus the value of the variable today is to some extent determined by yesterday's value. As we have seen, the EMH denies this since any information available in yesterday's price would already have been exploited in determining today's price. It is quite easy to test for serial correlation using the standard regression techniques employed to test many hypotheses in economics. If we make today's return,  $K_t$ , the dependent variable, our question is 'is  $K_t$  dependent, in any significant, way upon  $K_{t-1}$  or  $K_{t-2} \dots$  etc?' If we simply test for dependence upon the previous period's price then we estimate the equation:

$$K_t = a + bK_{t-1} + \varepsilon_t \quad (26.5)$$

If the EMH holds, then  $b$  should be zero, or at least it should not be significantly different from zero when subject to standard tests of significance. However, since the explanatory variable,  $K_{t-1}$ , is simply the lagged dependent variable, estimating the value of  $b$  is equivalent to estimating the correlation coefficient between  $K_t$  and  $K_{t-1}$  and many of the studies which use this approach prefer to report their results in terms of correlation coefficients. The reported correlation coefficients in most studies are extremely small (though not actually zero), typically less than 0.1 per cent. (Less than one-tenth of 1 per cent of the variation of today's return is explained by yesterday's return. See Elton and Gruber, 1995, Ch. 17.)

### 26.4.2 Runs tests

'Runs' tests are another way of examining successive price (or return) *changes*. If the EMH holds then

successive changes should be unrelated. This lack of a relationship sets a limit to the number of days on which a 'run' of consecutive price rises (for example) can occur. Too many in succession is more than coincidence. Thus, a large number of short runs tends to favour the EMH; a small number of long runs does not.

The tests are done by examining the behaviour of a price series over time and identifying each day's price as a '+' (a rise), a '-' (a fall) or a '0' (no change). A succession of days with the same sign is a run and so our price series will be divided into a series of runs. Notice that the shorter the runs, the more runs there must be in a given series. (If each sign were always followed by a different sign, the runs would all have the value 1, and the number of runs would equal the number of observations in the series!) Fortunately, we can be reasonably precise about the number (and length) of runs that we would expect if successive changes turn out to be the same only by chance. Firstly, we calculate the total number of '+', '-', and '0's and we note the number of runs, which we might denote  $\nu$ . Appropriate statistical tables will give us the critical value of  $\nu$ , given the number of '+', '-', and '0's. Such critical values are usually given for a 5 per cent level of significance. Remember that more runs indicates less association. Then if, for example, our table tells us that  $\nu_{crit} = 11$ , while our data gives us a total of seven runs, we know that there is only a 5 per cent chance of such a small number (long length) of runs occurring by chance. By contrast, there is a 95 per cent probability that the runs indicate some degree of association between successive changes.

The evidence of large-scale runs tests is that actual runs are often slightly fewer than one would expect from probability tables and this suggests some very slight evidence for positive correlation. But it is very slight: in many cases the actual runs are almost identical with the expected value and the closeness becomes very striking when the change is measured over longer periods, weeks say, rather than days.

### 26.4.3 Filter tests

The tests that we have so far described are tests for a linear relationship between current returns and past returns. As we have seen, there is little evidence of serial correlation. However, finding that price changes and returns are not related in a linear manner does not

mean that there is no relationship. It might be that they follow a more complex pattern. If this were true, then it might still be possible to earn excess returns by exploiting this more complex pattern and this possibility can be explored by formulating a trading rule based on the assumption of some pattern and comparing the resulting investment returns with a policy of simple 'buy and hold'. This argument forms the basis of 'filter rules' (and of some aspects of 'chartist' or 'technical' analysis).

Let us suppose, as seems reasonable, that the price of a security, instead of being rigidly fixed at a point, oscillates from day to day within fairly narrow bands around its equilibrium. The price breaks out of these bands only when genuinely relevant news arrives and the price moves towards a new equilibrium. Investors who buy when the price breaks through the upper band (or sell when the price falls through the lower band) will benefit. The trick, of course, is to identify the bands and this is done by formulating a 'filter rule' which says, for example, 'buy when the price rises by 5 per cent from its previous low and sell when it declines by 3 per cent from its previous high'. Here the filters, 5 per cent and 3 per cent, are being used to identify an unusually large price change which marks progress to a new equilibrium level (rather than a day-to-day fluctuation). In theory, the numerical value of the filter could be anything. It is simply a question of what (if any) filter works and that involves repeated testing.

Perhaps unsurprisingly, given the outcomes from regression and runs tests, **filter tests** do not suggest that there are past patterns of behaviour which can be profitably exploited. Certainly this is true when we allow for taxes and transactions costs.

A market that fails the tests for weak-form efficiency cannot be semi-strong or strong-form efficient. The converse, though, is not true and thus, since many tests suggest that markets are at least weak-form efficient, economists are naturally curious to know whether that efficiency extends in any cases to the semi-strong or even, possibly, the strong form. We look at one common way of testing each form.

The semi-strong form of the EMH says that publicly available news is so quickly incorporated in security prices that no advantage can be gained from studying this information. One way of testing whether or not this is true is to study the behaviour of prices with respect to public announcements of news. The methodology of **event studies**, as these are

known, is fairly straightforward and can be described in a series of steps:

- 1 Identify a sample of firms which experienced a major public announcement.
- 2 Identify the announcement day and number it 'zero'.
- 3 Define a period (say 30 days) either side of day zero.
- 4 For each firm, compute the actual return on each day.
- 5 Compute a 'normal' return for each day. Practice varies here but one common approach is to average the actual return on each day of other (unselected) firms in the same sector.
- 6 Compute the 'abnormal' return on each day by comparing the actual return with the normal return calculated in (5).
- 7 Some studies cumulate the abnormal return, but the crucial step is:
- 8 Examine the abnormal return (or the cumulated abnormal return) with respect to time.

If the market is semi-strong-form efficient then most of the abnormal return will be earned before or on the day of the announcement and it will not be possible, after the announcement, to use the news in order to earn abnormal returns. These tests, which were very popular in the 1970s and 1980s, generally found that the UK and US equity markets were semi-strong-form efficient and that information was incorporated in prices too rapidly for investors to be able to make subsequent excess returns.

If markets are strong-form efficient, then even private information is incorporated sufficiently quickly that it cannot be exploited to make consistent excess returns. Remember (from the last section) that what we are interested in here is the question of whether it is possible *legally* to benefit from the use of private information. In practice, this comes down to the question of whether 'private' information can be purchased legitimately at a price which allows above average returns to be earned and that in turn means that the tests of the strong-form EMH are usually tests of the performance of fund managers who have access to professional analysis and research. We might think it reasonable that analysts who follow closely the behaviour of a small number of firms or a particular sector, and who enjoy occasional briefings by firms' financial managers, might well acquire useful information before it is available to the general public. If there



is an advantage (and the market is thus strong-form *inefficient*) then managed funds should outperform a simple buy and hold strategy which could be proxied by a broad-based stock market index.

There have been many tests of managed fund performance over the years. However, many suffer from what is known as ‘survivorship bias’. That is to say, the very unsuccessful ones tend to last only for short periods with the result that studies that look at the performance of a sample of funds over a long period of time are looking at a sample of funds which, *by definition*, have a better average performance than the whole population of managed funds. Even so, the evidence from most of these studies does not suggest that there is much advantage to be gained from buying specialist information. The costs of that information are passed on to investors through bid–ask spreads and management charges and it is not generally the case that, once these are allowed for, investors would have done better than by buying and holding a portfolio selected (by themselves) based upon an index. Indeed, Elton and Gruber (1995, p. 437) cite studies where, with survivorship bias removed, managed funds perform worse than an index and, furthermore, where the underperformance is *positively* related to the scale of the management charges. In these circumstances, the apparent lack of interest in index tracker funds (noted above) is all the more surprising.

## 26.5 Market rationality

So far, we have been concerned with whether or not financial markets incorporate information into the pricing of assets sufficiently quickly that no one can have an informational advantage. We can pose this question about three different types of information and this gives rise to the three forms of the EMH. But we have not yet said anything about what information is relevant nor anything about *how* it is incorporated. All our tests so far tell us is that whatever information drives security prices and howsoever it is seen to be relevant to those prices, it does not seem possible to obtain this information in order to earn excess returns.

And yet much more is often claimed for the EMH. For example, it is often implied (and sometimes stated) that if the EMH holds then assets will be priced according to their fundamentals and funds will (with a few additional assumptions) be subject to optimum allocation. This does not strictly follow

from the EMH alone. Markets could be informationally efficient in the sense of making optimal forecasts on the basis of current information but ‘optimal’ only means that those forecasts are on average correct and cannot be improved upon. What it is that is driving prices is unspecified. It may be that markets are responding (super-efficiently) to information which drives prices but which economists cannot see to have any rational connection with prices whatsoever. The question of what information is relevant, and the model which links it to prices, is a separate question from the one of informational efficiency. Nonetheless, it is undoubtedly the case that many who would like to feel that the EMH holds would like also to feel that financial markets are efficient at directing limited funds to those uses that are in some sense better than others and so it is worth considering the additional conditions that are necessary.

To do this, we need only look back, quite briefly, to Section 11.4 where we discussed the ‘fundamentals’ of asset valuation. In Section 11.4 we were arguing that the capital asset pricing model gave us a *rational* explanation of how security prices were determined. The CAPM says that prices will adjust until the asset yields just that rate of return required by investors and then goes on to explain how that required rate is determined. The required rate of return is explained throughout as the result of attempts to maximize returns, subject to constraints, by rational investors. Furthermore, by establishing the required return as a rational process, the model then in effect imposes that return as the *cost* of capital to firms. Only those firms which have real investment projects that match this cost will have access to the funds. The ability of those investment projects to match the cost of capital depends upon the physical productivity of capital and the revenue for which its output can be sold. This in turn depends upon consumers’ willingness to pay and this, as all first-year economics students know, is carried to the point where the satisfaction from the marginal unit consumed is just equal to its price. *If* prices (and returns) are driven by the process described by the CAPM, then the pricing of financial assets is just one small part of a grand rational process in which everyone is doing the best they can to maximize their own well-being subject to constraints. If financial markets are informationally efficient, and prices are determined by the CAPM, then the informational efficiency is indeed important to an efficient and benevolent allocation of funds. But none of our tests so far shed any light on this question. We need something different.

The major challenges to the view that the market prices securities rationally, as well as efficiently, consist of volatility tests and the examination of major market movements such as the 1987 crash.

Volatility tests compare the actual variance in share prices with the variance in theoretical prices. Theoretical prices are those that one would have expected had securities been priced according to fundamentals in a model such as the CAPM. These can be calculated, *ex post*, using actual changes in dividend discount rates (resulting from changes in interest rates and/or in the market risk of an asset) and actual changes in dividends. The most famous of these tests was carried out by Shiller (1981) and it shows that long runs of US stock prices show much greater volatility than could be accounted for by the changes in fundamentals that actually occurred.

The other obvious challenge to the proposition that markets always produce rational valuations of securities comes from the spectacular booms and slumps that have occasionally hit asset markets. These range, chronologically, from the Dutch Tulip Mania

of the sixteenth century to the ‘dotcom’ boom of 2000 and include the 1929 Wall Street crash and the eighteenth century South Sea and Mississippi bubbles as well as the crash of October 1997. The argument of critics here again is that prices changed too far and too fast to be justified by any change in fundamentals. In the 1987 crash, for example, both the London and New York markets saw prices fall by 25 per cent in one day. *Ex post*, it is difficult to see any news that could have caused investors to reappraise either the discount rate, the current level of expected dividends or the earnings growth rate by an amount sufficient to cause a price change of this magnitude (but see Case Study 3 for a discussion of the required change in earnings growth). However, it is worth looking at the symposium of papers collected by Stiglitz (1990) to see just how careful one needs to be in looking at historic information through the eyes of those who had to interpret it at the time. What might look to us in retrospect to be evidently foolish interpretations of information may not have been without foundation for those trying to understand it at the time.

### Box 26.2 Irrational behaviour is correlated

In Section 26.6 we refer to evidence that the irrational behaviour of investors is not random. Errors do not cancel out. On the contrary, errors are correlated and so we observe firms with a string of good news becoming overvalued and vice versa. From an investment strategy point of view, this kind of behaviour suggests that a ‘contrarian’ approach is the way to ‘beat the market’ and make consistent excess returns. The following article, taken from the *Financial Times* of 29 May 2004, points to further evidence of ‘noise traders’ tending to adopt a herd-like behaviour with the result that their collective actions cause overvaluations. In this case the behaviour is based upon the view that a firm engaged in ‘new’ technology where there is a good prospect of earnings growth, deserves a valuation that assumes that rapid growth will go on forever. Once again, the evidence suggests that a strategy of doing the opposite from the herd would have produced better returns in the long run. Notice the reference towards the end to the position of the fund manager who is obliged to follow short-term fashions. This is another factor which limits ability of arbitrage to eliminate irrational prices. Many arbitrageurs are fund managers. They, in particular, face the risk that prices move against them before they can close an arbitrage deal. They cannot run the deal with an infinite time horizon (closing only when price anomalies are eliminated) because their performance is evaluated at short-term intervals.

## Don't be a mug when buying growth stocks

**PHILIP COGGAN**  
THE LONG VIEW

Every so often in capitalist economies a great business opportunity presents itself. The media are full of it. Investors clamour to support it. And usually it turns out to be a trap.

When the opportunity is obvious, many businesses attempt to exploit it. New capacity is created that often overwhelms the rosy forecasts of higher demand. Competition then drives down returns and many of the new entrants are forced out of business.

This theory, dubbed the capital cycle approach, has been used as a guiding prin-

ciple for almost two decades by Marathon Asset Management. The fund management group has collected some of its investment commentaries in a book\* covering, in particular, the excesses of the late 1990s.

The tendency for competition to drive excess returns back down to the cost of capital has been highlighted before – by Andrew Smithers and Stephen Wright

**Box 26.2 continued**

in their book *Valuing Wall Street*, for example. And the frequent failure of technological innovations to reward investors was well made by Sandy Nairn in his book *Engines That Move Markets*. Nevertheless, given how often investors have been fooled in the past, the rule is always worth repeating.

Indeed, Marathon points out that the cycle works profitably the other way round. Many investors shun well-established industries where there is little sign of growth. But those industries are often marked by an absence of new investment in capital. Eventually, a reduction in competition leads to higher returns for those that remain.

Sometimes this process can be frustrated when governments, or generous bankruptcy laws, intervene to prevent excess capacity being destroyed (the airline industry is a good example). Nevertheless the general rule, according to Marathon, is that 'it is better to invest in a mature industry where competition is declining than in a growing industry where competition is expanding'.

Stock markets form a vital part of the process. New issues are far more likely to occur in expanding sectors than in declining ones. Investment bank analysts have a tendency to project rosy earnings forecasts well into the future. Such forecasts usually fall prey to the 'fallacy of composition' in which a range of companies are all given a high value on the basis of their ability to exploit an expanding market.

When sectors are hot, shares rarely look cheap in terms of conventional measures such as dividend yield, historic price-earnings ratios or asset values. So the temptation is to find new measures such as Ebitda (earnings before interest, tax depreciation and amortisation) or new concepts such as 'first-mover advantage' or 'network effects' to justify the high valuations. Few are willing to say that the emperor has no clothes.

Source: *Financial Times*, 29 May 2004.

Those high valuations duly have an effect on the actions of managements. If companies are valued at a premium to the replacement cost of their capital, there is an incentive for them to invest more capital. Or as journalist Edward Chancellor writes in his introduction: 'When a hole in the ground costs \$1 to dig but is priced in the stock market at \$10, the temptation to reach for a shovel becomes irresistible.'

### While telecoms companies were soaring in value and index weight, few investors had the courage to sell

The telecommunications sector in the 1990s provided a golden example of the capital cycle in operation. The old national telecoms monopolies were facing competition from new entrants. Mobile telephone technology was reaching the 'tipping point' where it was transformed from a minority, business use into adoption by the vast majority of the population. The development of the internet offered the potential for vast amounts of data to be transmitted down phone lines including, for example, entertainment to be piped directly into people's homes.

Investors drooled in anticipation at the profits these new business opportunities would bring. Marathon reports that, in April 1999, Colt Telecom was valued at about five times the capital it *planned* to invest during the next five years. Level 3 Communications had virtually no revenues but planned to invest \$10bn in a fibreoptic network; its enterprise value (equity plus debt) was more than \$30bn.

Sure enough, more capital was invested in telecoms capacity, to the tune of \$500bn in the US and Canada, equivalent to \$5,000 per household. It was hard to imagine how such companies could hope to earn an economic return from such investment, especially as long-term phone charges were declining. But the companies kept on investing; how could they not? To admit to investors there was a problem with excess capacity would risk collapsing the house of cards; but every extra investment only made the collapse more certain.

Investment banks, eager to earn fees from the raising of capital by telecoms companies, had no incentive to point out the potential for disaster. And while telecoms companies were soaring in value and index weight, few investors had the courage to sell.

The problem investors face in standing back from the herd is that the cycle can take a very long time to unfold. Investors can be proved right in the long run but appear wrong in the short term as share prices in the sector soar and rivals rake in the profits. More than six years elapsed between Marathon's initial forebodings about the telecoms sector, for example, and the eventual share price collapse. That was plenty long enough for fund managers to get fired and lose their jobs.

Growth stocks usually disappoint in the end. A study by Sanford Bernstein of the 1965–1998 period found that only 19 per cent of growth stocks still qualified for that category after 10 years; after 20 years, the proportion fell to 5 per cent.

Of course, there will always be exceptions. But for every Microsoft, there are many more failures. Paying stratospheric valuations for growth stocks is a mug's game.

\**Capital Account: A Money Manager's Reports on a Turbulent Decade*, published by Texere, 283pp, £24.99 in UK, \$39.95 in US  
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## 26.6 Behavioural finance

Although the events referred to in the last paragraph have undoubtedly made people feel uneasy about the EMH, it nonetheless retains a strong appeal. To deny it is either to suggest that people *do not* make the best use of available information or that they are careless about their own self-interest. These are profoundly disturbing

possibilities to anyone brought up in the orthodox traditions of economics where the presence of rational, utility-maximizing individuals is axiomatic. Throw out the EMH and what, if anything, might be left?

But these puzzling cases (and other anomalies) persist and recent years have seen a radically different approach begin to emerge under the name of 'behavioural finance'.

At the most general level, behavioural finance is the study of human fallibility in competitive markets. (Shleifer, 2000, p. 23)

Behavioural finance theory rests on two foundations, whose significance we will explore below. The first is best called ‘investor sentiment’ which is a theory of how real-world investors form their beliefs and valuations. The second is that there are serious practical limits to the possibilities of arbitrage. The first can be seen as a theory of why investors might cause an ‘irrational’ price to emerge while the second is an explanation of why that price might not be corrected. Behavioural finance has made more progress with the limited arbitrage hypothesis than the theory of investor sentiment. Let us see now why they matter, beginning with **arbitrage**.

To understand the importance of arbitrage, we need first to recall that the EMH rests upon three theoretical foundations. The first is that investors are rational (and make the best use of information about fundamentals etc.). The second is that while *some* investors may not be rational (these are the ‘noise traders’ we referred to earlier) their irrational trades cancel and leave prices and returns to be determined by investors who are rational. Note that this amounts to saying that the decisions of noise traders are uncorrelated. Both of these foundations are weak. Investors do all sorts of strange things. They follow the advice of financial pundits (whose superior information is impossible under the EMH); they hang on too long to securities whose prices are falling. The latter is the result of a psychological trait which Odean (1998) calls ‘loss aversion’. They are reluctant to sell because this turns a notional loss into a real one. But they sell securities showing a gain ‘too soon’. The loss function seems steeper than the gain function. They trade too much. They buy expensively managed mutual funds (again on the basis that their managers have some superior information). If we assume that investors understand that there is a systematic relationship between risk and return then it is very difficult to explain how rational investors can behave as described by Benartzi and Thaler (1995), who found that investors were more inclined to buy equities when confronted with evidence of long-term returns than they were when shown only the evidence of volatility of returns. And so it goes on.

The third foundation is that even if irrational traders behave in the same way (their decisions *are* correlated) then profitable opportunities for arbitrage will force noise traders out of business, leaving pricing to rational investors. Given that we do have evidence of

irrational behaviour and even of correlated irrational behaviour, the role of arbitrage might be considered the ‘argument of last resort’ for the emergence and maintenance of efficient prices. If this fails, then the EMH is in serious trouble. This is why the argument in behavioural finance that the possibilities of profitable arbitrage are distinctly limited is absolutely fundamental to the debate. We look at this in more detail.

A common definition of arbitrage is that it involves the simultaneous purchase and sale of the same asset in two different markets at advantageous prices. This is just a rather formal way of saying that if the same asset has a different price in two different markets, there is a (riskless) profit to be made by buying the cheap asset and selling the expensive one. Clearly such trades will tend to bring prices in the two markets into equality, so arbitrage is an important underpinning of the law of one price. Just as important, however, is the fact that an arbitrage deal delivers a riskless profit and therefore traders who are well informed and can carry out these trades will make a profit. At the same time, the ill informed, or noise traders, will be the ones who are buying the overpriced securities sold by the arbitrageurs (and selling the underpriced securities to them). This cannot go on forever. Eventually, the noise traders must lose all their wealth, drop out of the market and leave pricing to the well-informed arbitrageurs.

But behavioural finance asks us to think more carefully about what arbitrage involves in practice. For the trade to be riskless, the arbitrageur has to be able to sell (or sell short) an asset which is overpriced and buy (ideally) the same asset cheaply. The practical

#### More from the web Behavioural finance

Behavioural finance is also well represented by sites on the internet, though there maybe fewer than those devoted to the EMH.

Two excellent sites are:

[www.behaviouralfinance.net](http://www.behaviouralfinance.net)

which provides a very extensive glossary of terms (and reading) of importance to behavioural finance. To get the best from the site, of course, it helps to have some idea of how the terms fit into the story.

A better pace to start for absolute beginners is probably: [www.finpipe.com](http://www.finpipe.com) which begins with an introductory essay and then many links to take the issue further.

problem to which this gives rise is that there is often no (underpriced) close substitute available for the asset which is overpriced. Suppose a trader thinks that stocks in the FTSE-250 index are generally overpriced. S/he can borrow (and sell short) those stocks in the anticipation that the price will later fall. To make the deal riskless, however, s/he has to be able to buy the same portfolio at a lower price. This is because s/he has to return the FTSE-250 stocks to the lender at the end of the deal at *their then market value*. Suppose s/he holds no alternative at all. In other words s/he has simply sold shares which s/he has borrowed. If (unexpectedly) the portfolio is hit by good news between the day of the sale and the date for their return to the lender, then the trader will have to enter the market and buy the shares at a higher price than that for which they were sold. The only way that the arbitrageur can be sure to make a riskless profit is if s/he was able to buy at the beginning, at a lower price, the same set of shares that s/he has sold (or sold short). In these circumstances, any unexpected news that affects the price of the borrowed shares will automatically affect the value of the shares which are held. This is the problem of being able to find a suitable 'hedge'. Obviously, this tends to be easier when the arbitrage involves a single security and increases in difficulty as we try to hedge portfolios.

Another practical problem is one of time. If an arbitrage deal is done with imperfect substitutes (or no substitute at all) then there is the risk that prices which are expected to converge eventually might diverge before the deal has to be closed. For example, the arbitrageur borrows and sells short an asset which is overpriced at the same time buying another (but not identical one) which seems underpriced. The loan will be for a specified period. During that time the overpriced asset might rise further in price. And if the hedge is imperfect, it will not move in the same way and will not offer full protection to the holder. Alternatively, it might be that the hedge itself, while underpriced, falls further.

The point of these (and other possible examples) is that the riskless arbitrage deal is more plausible in theory than in practice. In practice, arbitrageurs are forced to take risk and this will limit their ability to guarantee the elimination of mispricing. (See Shleifer, 2000, pp. 13–16.)

But why should mispricing occur in the first place? This is where a theory of how investors process information and form judgements is required. At the moment, behavioural finance draws much of its inspiration from work in psychology but it is not impossible that work in experimental economics will shed light on this in future.

Two important behavioural hypotheses in the current literature are 'conservatism' (Edwards, 1968) and 'representativeness' (Tversky and Kahneman, 1974). Together they show (as the result of experimentation) that people are slower to modify or update their understanding than is warranted by the evidence but that once they cross this threshold, they regard what may be random occurrences as confirming a pattern. The classic experiment involves the tossing of a coin which is *known* to the experimental subjects to be unfair in the sense that it has (say) a 70:30 bias. But the subjects do not know in which way it is biased – 70 per cent heads or 70 per cent tails. So far as the subjects are concerned, therefore, the probability of each bias is 0.5. The experimenter then begins tossing the coin (which we will assume is heads biased). At each successive toss the outcome is the same and subjects are asked after each toss to give their estimate of the probability that the bias is indeed heads. Predictably, their estimate of the probability, beginning at 0.5, rises quite quickly in the face of repeated outcomes of heads. But the striking thing is that in the early stages it does not rise as quickly as it 'should' if the subjects were following truly Bayesian principles. Equally interesting is the discovery that after a few tosses the underestimate of the Bayesian probability switches to an overestimate. The early tosses in a series seem not to have the impact that they warrant, while the later ones are seized on as evidence that the world is more certain than it really is. The first is evidence of 'conservatism': news has to be repeated until its real significance is appreciated. The second is evidence of the 'representativeness': if news recurs often enough, it is treated as belonging to a pattern and the possibility of randomness is discounted.

It is not difficult to see how these tendencies could be translated to a financial context. For example, we assume that investors have a particular view about a company and the value of its stock. They then receive news about the firm to which their response is less than would be the case if they acted according to true Bayesian principles. But the news keeps coming and eventually is interpreted, falsely, as part of a trend which is going to continue forever. In the first phase, investors underreact to the news and in the second phase they overreact.

Evidence that this is in fact what happens comes from numerous studies but the easiest to understand are those where a stock which experiences a sustained period of poor news subsequently outperforms stocks which have been the subject of good news. This evidence suggests that the firm with consistent good news

and earnings has become overvalued while the stocks with a run of bad news are undervalued. Investors can therefore earn abnormal returns by betting against this overreaction to news by buying the bad news stocks and selling the good news stocks. The best known of these studies was carried out by De Bondt and Thaler (1985) who, for each year since 1933, constructed a ('losers') portfolio of the worst performing stocks and a ('winners') portfolio of the best performing stocks judged by their performance in the three previous years. They then computed the performance of each portfolio in the five years following its formation. Averaging the results across the approximately 50 'winner' portfolios and 50 'loser' portfolios showed a clearly superior return for the 'loser' portfolios. It is impossible to avoid the conclusion that the good news portfolios had been overvalued while the bad news portfolios were undervalued.

Why people should behave in such a way that they are led to make persistent under- and overvaluations is a mystery but it is one on which experimental psychology may eventually shed some light. Certainly, looking at research into human behaviour in other branches of the social sciences seems more likely to produce satisfying answers than simply *assuming* that people with superior information are bound to impose the correct valuation on everyone else.

## 26.7 Summary

Markets can be efficient in a number of ways, but the term 'efficient markets' is usually understood to refer to informational efficiency and this in turn refers to the speed with which markets react to information. If markets are informationally efficient then prices adjust so quickly to new information that it is impossible for any agent to exploit information in order to make

consistent excess profits. The degree of informational efficiency is distinguished by reference to the type of information to which markets respond quickly. If current security prices incorporate all the information contained in past price behaviour, they are said to be 'weak-form' efficient. Markets which are 'semi-strong-form' efficient incorporate all publicly available information too quickly for any trader to exploit it profitably while markets which are 'strong-form' efficient react quickly even to information which is not universally available.

Tests of the EMH tend to support the hypothesis in its weaker forms. The evidence is not quite so convincing for the strong form of the hypothesis though it still seems unlikely that investors can derive sufficient advantage from private information to make consistent excess profits after allowing for the cost of acquiring the information.

The EMH only says that investors use information to make the best possible forecast of future prices and/or yields. In this respect, it assumes that investors behave 'rationally' by learning from any past mistakes or being driven from the market. Thus the EMH assumes that investors apply their information to the 'best' model of security pricing, where 'best' means the one that the market appears to use. What this model may be is a separate issue. It could be that the market values assets according to their 'fundamentals', in the manner described by the CAPM. If that is the case, then fluctuations in security prices and returns should reflect fluctuations in these fundamentals and we could then describe markets as behaving 'rationally'. However, the evidence for market rationality is not so convincing as the evidence for the EMH. The alternative, suggested by behavioural finance, is that many investors simply do not attempt to find the best information but instead, for reasons we do not yet fully understand, adopt 'rules of thumb' while lead to persistent errors, which arbitrage is unable to eliminate.

### Key concepts in this chapter

Operational efficiency	Weak-form EMH	Serial correlation
Allocative efficiency	Semi-strong-form EMH	Runs tests
Informational efficiency	Strong-form EMH	Filter tests
Pricing efficiency	Fair game model	Event studies
Relevant information	Random walk	Behavioural finance
Market rationality	Insider trading	Investor sentiment
Rational expectations	Bargains	Arbitrage
Optimal forecast	Index tracker funds	

## Questions and problems

- 1 Distinguish between the meanings which can be attached to 'efficiency' when applied to financial markets.
- 2 What forces tend to make financial markets informationally efficient?
- 3 Distinguish between the different forms of the efficient market hypothesis.
- 4 How might an investment strategy appropriate for a market which is informationally efficient differ from one appropriate for a market which is inefficient?
- 5 How might you test for 'weak' and 'semi-strong' efficiency?
- 6 You suspect that directors' purchases/sales of shares in their own firms are an indicator of future share price movements. How would you test whether such information could be profitably exploited?
- 7 Explain what is meant by 'investor sentiment'.
- 8 Why might arbitrage fail to eliminate mispricing?

## Further reading

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[www.investopedia.com](http://www.investopedia.com)

[www.investorhome.com](http://www.investorhome.com)

### Case Study 1 The structure of banking and conflicts of interest

In the spring of 2002, the international banking world was shocked by the discovery that several US investment banks had behaved towards their clients in a way which revealed glaring conflicts of interest. The episode brings together a number of aspects which we have touched on at various points in the book. For example, it reveals the sharp difference in focus between retail and investment banks (Section 2.3); it also illustrates the fears that some people expressed at the time of the 'Big Bang' reforms of the London Stock Exchange in 1986 (Section 17.5.2); it provides another reason why the price of shares may not always reflect the underlying fundamentals of the firm (Section 11.5) and thus it contributes to the debate about financial market efficiency and the question of whether some people have an information advantage (Section 26.3).

In Section 2.3 we distinguished between different types of banking activity. Retail banks, we said, were banks which offered loan and deposit, money transmission and a range of other services to the personal sector. Such banks are likely to be parts of a large banking conglomerate, other parts of which would be engaged in wholesale banking. Barclays and HSBC in the UK, Citigroup in the USA and Deutsche Bank in Germany are obvious examples. Very likely this would include corporate banking – offering similar services as retail banks but designed for the corporate sector – and investment banking. The latter would involve advising firms in mergers and acquisitions, making new issues of shares and bonds for firms, mutual fund management, equity and bond analysis and even acting as a market maker in a range of shares. While retail banks were likely to be part of a conglomerate which included wholesale banks, we noted that the opposite was not the case. Many wholesale banks are

'free-standing' specialists in corporate or investment banking. Amongst the largest and best known of the latter are firms like Goldman Sachs, Merrill Lynch, Lehman Brothers, Morgan Stanley and Credit Suisse First Boston (CSFB).

In May 2002 the *Financial Times* reported that some share analysts at Merrill Lynch in New York had been publishing judgements about the shares in some companies which they knew to be false. As the story grew, the New York district attorney, Elliot Spitzer, ordered an investigation and evidence began to appear in the form of colourful emails which were being sent to colleagues within the bank. One of the analysts, central to the scandal, was named Henry Blodget and the investigation found emails which he had sent to investment management colleagues within the bank warning them that some companies (particularly in the dotcom and telecoms sectors) were virtually worthless and that their shares were overvalued. These private judgements were quite different from the public reports which he was writing and sending out to fund managers and to private clients of the bank.

The accompanying extract from the *Financial Times* was written towards the end of the affair, in April 2003, and it shows the reason for this deception in paragraphs two and three where Blodget is reported as celebrating the amount of 'banking' business the analysts are bringing in and rating it as much more important than the research they are supposed to be doing. Much of the work done by an investment bank is to assist firms in negotiations over mergers and acquisitions (negotiations which may become very aggressive if an unwelcome takeover bid is launched) and to make new share and bond issues for the firm. This is the really profitable part of the business and



# Global settlement: Blodget pays out \$4m and gets life ban



by Charles Pretzlik

Henry Blodget, Merrill Lynch's former star technology analyst, has agreed to pay \$4m to settle charges of misconduct from US securities regulators. He will also be barred from the securities industry for life.

According to court documents filed by the Securities and Exchange Commission, 'from at least July 1999 through June 2001, research analysts at Merrill Lynch were subject to inappropriate influence by investment banking at the firm'. The complaint, filed in the US District Court for the Southern District of New York, alleges the bank published 'false or misleading research', published 'exaggerated or unwarranted research or research that lacked a reasonable basis'. It also said the bank failed properly to supervise research and investment banking. In a March 1999 e-mail, Mr Blodget said: 'We are now up to 11–12 internet banking transactions in the pipeline . . . The current schedule for this week . . . is 85 per cent banking, 15 per cent research.'

Merrill bankers used research as bait for investment banking business. In an April 2000 e-mail, one banker asked: 'Do you think we should

aggressively link coverage with banking – that is what we did with Go2Net (Henry [Blodget] was involved).' The documents also indicate that Merrill's draft research and proposed rating changes were sometimes shown to the companies being covered ahead of time, as well as to investment banking colleagues, despite internal rules banning this.

In February 2001 a Merrill analyst sent an unpublished report to Tyco's chief financial officer with the following note: 'PLEASE REVIEW ASAP. I WILL NOT SEND ID OUT UNTIL I HEAR FROM YOU FIRST! LOYAL TYCO EMPLOYEE!'

It is also clear that analysts came under pressure from colleagues in investment banking seeking to influence coverage of stocks. Merrill research management acknowledged this in an October 2000 e-mail to Mr Blodget. 'I think we are off base on how we rate stocks and how much we bend backwards to accommodate banking etc,' it said. The regulators said that on two companies, GoTo.com and InfoSpace, Merrill published research that failed to reflect its analysts' privately expressed

negative views, 'making the reports materially false and misleading'. On the day that Merrill initiated coverage of GoTo, 11 January 2001, Mr Blodget received an e-mail from an institutional client which asked: 'What's so interesting about Goto [sic] except banking fees????' Mr Blodget replied: 'Nothin.'

While working on the initial research report on GoTo, a junior analyst said in an e-mail that retail investors might lose their retirement 'because we don't want [GoTo's CFO] to be mad at us'. On InfoSpace, Mr Blodget wrote e-mails reporting 'enormous skepticism'.

A September 2000 report into Internet Capital Group provided a favourable rating. Yet in a private e-mail about it two weeks later, Mr Blodget wrote: 'This has been a disaster . . . There really are no "operations" here to fall back on, so there really is no "floor" to the stock.'

Merrill will pay \$100m in penalties, plus \$75m over five years to fund independent research and \$25m to fund investor education.

Source: *Financial Times*, 29 April 2003.

so investment banks compete keenly for the role of adviser to the largest firms. Consequently, M&A activity (as it is often called) is also where the really big salaries and bonuses are earned. Clearly no investment bank will want to upset a client firm by publishing adverse reports about it to the investing community. The *Financial Times* refers to the case of GoTo where a junior analyst is worried that some retail investors (taking the published analysis in good faith) might lose the whole of their retirement savings by following the advice on GoTo, just because Merrill Lynch did not want to upset GoTo's Chief Financial

Officer by telling the truth. Hence share analysts at some investment banks were, it seems, under great pressure to find positive things to say publicly, even about firms which they thought privately were poorly run and managed or had poor profit outlooks. As the *Financial Times* report says, in the case of Internet Capital Group, the private view was that it was 'a disaster' with 'no "operations" here to fall back on' and yet they gave it a favourable rating in public.

In Section 17.5.2, we explained that, prior to 1986, the London Stock Exchange was closed to public corporations. The only firms allowed to trade on the LSE

were partnerships. This restricted their size, prevented economies of scale and allowed them to survive only by operating a set of fixed commissions which were much higher than large US banks were charging for dealing in shares on the NYSE. When the decision was finally made to sweep all this away and to allow large firms to set up stockbroking and/or market-making facilities in the London Stock Exchange, it was clear to everyone that the firms wishing to join would be international investment banks. A conflict of interest was immediately foreseen. If investment banks were specialists in researching the value of companies and their shares and in floating new issues, it was clearly possible that they might use some of this specialist and inside information to give themselves an advantage when it came to making markets in various stocks. This was not quite the same conflict that emerged in the Blodgett case – the problem at Merrill Lynch was that one part of the bank had specialist knowledge about the value of firms and shares while another part of the firm was managing investments for bank clients and another part was advising firms on M&As and new issues. If the clients in the M&A/new issue part of the bank were to be kept happy they needed to see

flattering reports. But then someone needed to tip off the investment managers that they should not believe what their colleagues were publishing. But the principles were the same. In the case of ‘Big Bang’ the London Stock Exchange insisted that if investment banks wished to become market makers then they must put up what were famously called ‘Chinese Walls’ between the various departments of the bank. These ‘walls’ were a set of rules which were intended to prevent the flow of information from one part of the bank to another. Provided the wall was intact, the theory went, the analysts would have no incentive to tell two different stories. With the wall in place, they would not be able to tip off their own fund managers that their public reports were false and so publishing a misleading report would run the risk that the bank’s own managers would believe and act on it. Eventually, as part of the settlement, the US banks involved (in addition to Merrill Lynch – Bear Stearns, CSFB, Goldman Sachs, Lehman Brothers and Citigroup) agreed to pay large amounts in compensation and fines (\$400m in the case of Citigroup) and to introduce structural reforms to insulate research analysts from the influence of investment bankers.

### Questions for discussion

- 1 Why might the CFO at GoTo have been ‘mad’ if Merrill Lynch had published an adverse report about his firm?
- 2 What does this incident suggest about the strong form of the efficient markets hypothesis?
- 3 How effective do you think that the reported settlement is likely to be in preventing more cases of this kind?

### Further reading

A M Santomero and David F Babbel, *Financial Markets, Instruments and Institutions* (New York: McGraw-Hill, 2e, 2001) Ch. 21.

### Case Study 2 The dotcom phenomenon

One of the most startling features of recent stock market history was the dramatic rise and fall in popularity and value of technology stocks in the course of roughly two years between early 1999 and March

2001. The background to this was a steady rise in share prices which had begun with the recovery after the 1987 Crash and had begun to increase in speed from about 1995. The upward trend was most dramatic

in the USA, more moderate in the UK and the EU, decidedly bumpy in SE Asia where markets suffered a temporary fall in 1997–98 and largely absent in Japan. During 1997 it became apparent that the rise in prices was more marked in some sectors than in others and that these sectors shared one common feature, namely, their ability to exploit the latest developments in communications technology. Collectively, the stocks became known as ‘TMT’ or ‘Technology, Media and Telecom’ stocks. Within this grouping, the so-called ‘dotcoms’ were companies which were going to exploit the advantages of the internet, usually by establishing an internet site which enabled people to browse, select and pay for goods, services or information ‘online’. And it was this subset of TMT stocks which saw the most dramatic action.

The two articles reprinted here appeared in the *Financial Times* almost exactly a year apart. The first was published in March 2000, when technology stocks were at their peak. It refers specifically to the extraordinary behaviour of investors towards dotcom stocks and shows that the *FT* was already worried that they were taking excessive risks with shares whose prices could not be justified. The second describes what happened in the following year. In retrospect, the episode is quite entertaining. But there are serious aspects to it as we shall try to show by drawing on some of the theory we have discussed in earlier chapters.

The first article begins by pointing out that even cautious investors are likely to be exposed to high-risk investment in dotcom companies. The reason for this is that the share price of some of these firms was so high that their market capitalization (number of shares  $\times$  price) put them amongst the 100 largest UK firms. As such, they became eligible for membership of the FTSE-100 share price index. Clearly, since market capitalization varies with share price, even in normal times eligibility for membership can come and go, especially for firms with a value around the 100th threshold. In order to prevent high-frequency oscillations, the FTSE membership rules employ a filter which requires that firms outside the index have actually to achieve a capitalization which puts them at least as high as 90th before entry, while a firm which is in the index has to drop in value to 110th before being excluded. But these were not normal times and the quarterly revisions to the index saw new dotcoms being added in March 2000 and excluded again in June. The important point being made in the article,

however, is that once a firm is a member of the FTSE-100 (and many other indices for that matter) its shares are immediately bought by fund managers. This may be because the fund has been set up in order to replicate (or ‘track’) an index or because it has rules which require managers to put at least a given percentage of the fund into the shares of large companies, in the traditional view that ‘large’ means ‘safe’. Consequently anyone with a pension fund or index tracker fund could, in the spring of 2000, have found themselves exposed to these very high-risk companies.

The other side of this picture, as the article notes in the third paragraph, is that long-established firms, with good profit records and a long history of supplying the general public with goods and services which it certainly needs (Thames Water was an example) found themselves dropped from the index in favour of a firm for whose output there was no definite demand.

One of the firms involved in this dramatic rise in value was Lastminute.com, whose shares were floated on Tuesday, 14 March 2000. As the second article reports, after the initial announcement of Lastminute’s forthcoming flotation, the demand for dotcom shares pushed prices to the point where the issuing bank decided to raise the indicative price of the shares from a range of 190–230p to 320–380p, an increase of 67 per cent. We return to this later.

The rest of the first article draws attention to the risks associated with investing in these companies, suggesting that it is something that ought to be done by specialist venture capital fund managers. It also gives three reasons for the extraordinary boom in dotcoms. The first of these is the slackening of listing rules by many stock exchanges. The London Stock Exchange, like many others, used to insist that firms coming to the market have a well-established trading record. The second is that the technology behind ‘e-commerce’ firms meant that they had to move quickly in order to get any advantage from being the first to think of an idea. If they had to trade for several years before getting a listing, their competitors would have ample time to catch up. And, thirdly, the technology also required large amounts of capital at the time of initial start-up. It was not possible to start in a small way and expand subsequently.

Looking back from a year later, the second article begins by recalling that the dotcom boom required people to behave in ways that broke most rules of sound business. It also gives evidence of the frenzy by referring to the 88 per cent rise in the NASDAQ index

## WE ARE ALL VENTURE CAPITALISTS NOW

We are all capitalists now, according to the aphorism that echoed through the post-communist 1990s. But a more accurate slogan for the new millennium might be: 'We are all venture capitalists now'.

For these days anyone with a pension fund, an index tracker fund or a direct holding in many of the newly quoted dotcom companies has some exposure to the kind of high-risk, high-return investments more normally associated with the venture capital industry.

The trend has been highlighted by two events this week: the remarkable changes in the FTSE 100 index, where profitable 'old economy' stocks have been replaced by a clutch of loss-making high-technology ones; and the flotation of Lastminute.com, the small online retailer. Such a stampede seems to be developing for its shares that it could be valued at close to £1bn when dealings start on Tuesday, even though it is not expected to turn a profit until 2004.

The venture capital industry specialises in funding very young companies that have a good idea but an unproven business model and makes its money when its companies are sold, either in a flotation or to another group. Once upon a time the industry aimed to get a decent return on its initial investment in five to seven years. But nowadays high-technology companies are being brought to market much more

quickly and often at a much earlier stage in development, well before their business model is proven. Take, for example, Freeserve, the internet portal. Ironically, it has joined the FTSE 100 in the very week that the model on which it was founded – funding free internet access by creaming off part of the telecoms bills run up by customers – was dealt a probably mortal blow by rivals.

Three factors explain this rush to market. First, the rules have changed. Stock exchanges across the western world, anxious to be seen as innovative and scared to be left behind by rivals, have relaxed listing rules. The London Stock Exchange has largely dropped its requirement that a company have a three-year trading record before admission to its main market: Lastminute.com's web site was set up only 18 months ago.

Second, companies with good e-commerce ideas need to move quickly to establish 'first mover' advantage and if their growth requires very large amounts of capital they may need to tap the equity markets.

Third, there are companies that could well meet their financial requirements from within the venture capital industry but are coming to market quickly – 'a short flip' in the jargon – to capitalise on the insatiable demand and extraordinary high prices they can get for these stocks.

'Today the market is applying a lower discount rate to the future

earnings streams of high-tech companies than the venture capital industry would,' according to one leading figure in the sector. Translated into plain English that means stock market investors are often prepared to make wildly optimistic assumptions about prospects for these companies, although venture capitalists who understand them are not . . .

Lastminute.com provides an example of the kinds of risk to which investors are being exposed. Its revenues are minuscule, its losses are growing, and its business model is, to put it politely, far from proven. Its big idea sounds initially plausible – selling online last minute goods, such as cheap flights – but it is questionable whether there is a market here that cannot be tapped more efficiently by industry heavyweights.

Investors who buy high-tech stocks at such an early stage of development may be rewarded with high returns, but they are taking on huge risks without any means of controlling them, apart from the hope of selling quickly if the market turns sour. And over the long term, the odds are stacked against them. Venture capitalists reckon that for every 10 investments they make, only two will be unqualified successes, two will be total write-offs and six will cause them problems. That is a hell of a gamble if you are buying into a company at a sky-high dotcom price . . .

Source: Martin Dickson, *Financial Times*, 11 March 2000.

over a five-month period. NASDAQ stands for National Association of Securities Dealers Automated Quotations. It is based in New York and the majority of the shares listed are technology firms which means that movements in the overall price of NASDAQ

shares provides quite a good indication of what is happening to technology stocks, at least in the USA. On 10 March 2000, the index stood at its all-time high of 5049. Exactly one year later it had lost 59 per cent of its value. The article then goes on to show

# DOTCOMBUSTION FT

Twelve months ago, dotcom mania was at its peak. And nowhere was it more obvious than in the panelled rooms of one City investment house. Sitting across the table from two dotcom entrepreneurs, an experienced investment banker was struck by the hideous realisation that the men facing him were trying to float nothing more than an idea for more than £100m. And they had no relevant experience.

'You don't understand,' the ebullient chief executive said. 'This is not about performance, it is about a concept. If we started executing the plan it would lose its purity and investors wouldn't be interested.' The discussion was short and the company never reached the stock market. But, for a few months at the beginning of last year, investors' seemingly insatiable appetite for dotcom companies put normal business rules on hold.

Nasdaq, the US technology market that helped drive dotcom mania on both sides of the Atlantic, rose an astonishing 88 per cent in less than five months. It ended its seemingly unstoppable rise on Friday, March 10 – a year ago today – but the week leading up to the peak typified the frenzy surrounding anything 'dotcom'. That week started with Alta Vista, the internet search engine, grabbing the headlines by becoming the first in the UK to offer unlimited access to the web for a flat fee – a promise it admitted five months later it could not afford and never actually launched. The same day saw the start of bidding in the UK for third-generation mobile phone licences. The five 3G licences were originally expected to raise £1.5bn. But the competitors – beguiled by the prospect of huge revenues from mobile internet services – entered a bidding frenzy that ended in a £22.5bn windfall for the Treasury and saddled the companies with a pile of debt that has scared investors off the sector ever since.

The action of dotcom investors, like 3G bidders, seems incomprehensible in the cold light of day. But at the time people would pay almost

any price for a piece of the action. Their excitement about the dotcom revolution was outweighed only by a sense of panic that they might miss the opportunity of a generation.

Michael Ross, chief executive of Figleaves.com, which sells lingerie online, says: 'You had to be pretty stubborn to sit on the sidelines and predict doom instead of getting involved. People were making real money and many of those who did take the risk still have the fortunes to prove it.' Everybody had a dotcom idea to discuss in the pub. Most never came near fruition. Instead, people ranging from the Queen – who invested in Getmapping.com, an internet mapping company – to housewives, professionals, manual workers and students got involved by investing in dotcoms listed on the seemingly unstoppable stock markets, where demand far outstripped the supply of shares.

**'We all invested in a few (dotcoms). You look at it now and think you must have been a bit crackers.'**

A favourite was Lastminute.com. Thursday March 9 saw Lastminute – probably the most hyped dotcom flotation of all – raise the price range for its imminent flotation by an unprecedented 67 per cent following huge retail demand. The following day Nasdaq hit an all-time high of 5,049. A year on the picture could scarcely be more different. Nasdaq has lost 59 per cent of its value, completely choking off the flood of internet flotations. Many would-be entrepreneurs who rushed into risky start-ups have returned even faster to the security of a monthly salary in a profitable company.

The red-hot venture capital market – which famously gave Clickmango.com's youthful founders £3m in only eight days to set up a natural health products e-tailer – has turned off the taps, replacing the flow of dotcom millionaires with a steady drip of internet collapses – including Clickmango itself. Private investors have also been burned.

Oxygen Holdings – which soared 29-fold on its debut in February 2000 after raising £2.2m to invest in students' dotcom ideas – has tumbled more than 96 per cent from its peak value of £214m and now sits below its float price. Other favourites such as QXL.com, the online auctioneer, and Durlacher, the internet investment company, have fallen by a similar amount.

Trading volumes, which rose 50 per cent from normal levels in the first quarter of 2000, have returned to earth as the appetite for risk has disappeared. The latest figures from Autif, the fund management industry body, show sales of technology funds falling from £878m in March 2000 to £74m in January this year.

The dotcoms themselves, says one venture capitalist, are having a 'breath-holding contest'. The focus has changed in a year from trying to build a business as fast as possible, with scant regard to losses, to conserving cash at any cost to remain the last man standing. Lastminute cannot have imagined how important the extra cash it earned by raising its float price would be.

Some dotcoms will make it. But as their number dwindles, it would be hard to believe the frenzy of last year had ever happened were it not for everyday reminders: the range of specialist internet magazines on newsagents' shelves; the huge cash piles that some companies raised at the top of the market and still control; and the underlying uptake of the internet, which has made it a part of everyday life for many.

Michael Jackson, chairman of Elderstreet, the venture capitalist, remains philosophical about the whole experience: 'We all invested in a few (dotcoms). You look at it now and think you must have been a bit crackers,' he says. 'But at the end of the day you are not paid to sit on your hands while others are making money.'

Source: Ben Hunt, *Financial Times*, 10 March 2001.

what this dramatic decline meant for individual firms like Clickmango.com, QXL and Oxygen Holdings.

What neither article explains directly, but is obviously a major question looking back, is why investors were so willing to pay very high prices for shares in companies with no profits, whose technological characteristics made them extremely risky. Each article offers a clue, however, which we can interpret with the help of earlier discussion. The first article comments that ‘the market is applying a lower discount rate to the future earnings of high-tech companies than the venture capital industry would’. The Gordon growth model which we have used throughout this book,  $P = D_1/(K - g)$ , is not entirely appropriate in this context because the firms in question had no current earnings (let alone paid dividends) but it suggests the article can be interpreted as saying that the reason prices were so high was that a lot of investors were employing a much lower value for  $K$  than would normally be the case. Why should this be so? It is unlikely to be because of a false estimate of the risk-free rate. It seems more likely that they were employing too low (even a zero?) risk premium.

It may be, however, that in these circumstances we need to abandon conventional approaches to valuation. Look at the closing sentence of the second article. Here is a fund manager saying that when prices are going up (even if you have doubts about the wisdom) your clients expect you to buy in order to earn them a slice of the profit: ‘. . . you are not paid to sit on your hands while others are making money’. This is the dilemma that faces all fund managers. Their responsibility is to their investing clients and if their investing clients want maximum short-term profit then the manager must follow market sentiment whether or not he or she thinks it soundly based. And the pressures for short-term performance are considerable. Many newspapers run annual league tables of fund performance in which managers are implicitly judged against an index or against other fund managers. If you are a manager, it is no use saying to your clients when you come bottom of the league, that your decision not to buy dotcom stocks was correct ‘in theory’ or ‘will be proved right in the long run’. In the long run, your clients will have left and you will have been sacked. This is the insight (inverted) behind Keynes’s remark quoted in Section 11.5. It is no use offering a price for an asset which you may think theoretically correct, if you think the market will value it at twice that amount three months hence.

Although it is not mentioned in either of the articles, we should also remember the background that we outlined at the beginning, namely that in the UK and USA shares had been rising almost continuously for more than ten years. As time goes by, memories fade (and the most experienced personnel retire). There comes a time when few can remember that prices can also fall. Furthermore, it may be that markets, rightly or wrongly, are coming to see an additional role for central banks. In Sections 2.3 and 9.4, we refer to ‘lender of last resort’ as a key function of central banks. As we explain, this is usually understood to mean lender to *banks* in the event of a system-wide liquidity shortage. But there have been occasions in recent years where central banks, led by the Federal Reserve, have reduced interest rates seemingly in response to potential problems in financial *markets*. It happened in the October 1987 crash (from which recovery was quite rapid). It happened again in the SE Asia crises in 1997, again in 1998 when it looked as though a major US hedge fund (Long-Term Capital Management) was going to collapse and one might argue that this is also a possible interpretation of the Fed’s rate cuts in March and April of 2001. In these circumstances, if central banks are underwriting the risk of equity investment, we are entering a new era in which conventional beliefs about the required premium for equity holding are all wrong. It also raises issues of ‘moral hazard’ (see Section 2.4). If investors believe that the central bank will prop up financial markets as well as banks, they may become much less cautious about investing in risky projects.

So much for possible *causes*; what about the implications of the ‘boom and bust’? Clearly some people will have made substantial profits by buying and selling at the right time. Others will have made substantial losses by doing the opposite. There must, therefore, have been some redistribution of wealth.

More importantly, the rapid rise in TMT (the broader category) stocks after 1997, and its effect in increasing people’s wealth, seems likely to have had some considerable impact on consumption spending in the USA, where household saving dropped effectively to zero. (There is no need to save, if your wealth is going to increase without it.) The subsequent decline in prices has had the opposite effect and is closely woven into the delicate balance between a slowdown in growth and a genuine recession that faced the US and other economies in early 2001.

What we should also consider are the implications for capital allocation. In Section 1.5.3, we noted that one of the ways in which the performance of a financial system can affect the rest of the economy is through its ‘allocative efficiency’, its ability to allocate funds to their most productive use. Ideally, for such allocative efficiency to exist, one would wish that the best-managed firms were the most profitable firms. If markets valued their shares according to Equation 11.6, the good management and the good earnings would be reflected in a ‘high’ share price. A high share price would mean a low cost of capital (Section 17.4.3) and this would be some encouragement to such firms to borrow, to invest and expand. The result would be an increase in output from a firm which had a proven record of providing what society valued, in the most efficient way (see Sections 11.5 and 26.5).

But contrast this with what happened in case of dotcom firms. These were firms, we said earlier, which had earned no profits. There was, strictly speaking, no evidence that they were providing things which people wanted at a price which would justify their production. Nonetheless, these firms attracted large capital flows in the hope that they would eventually meet a genuine demand. Furthermore, as the price of

the shares increased, their cost of capital fell. Consider again Lastminute.com. Its advisers originally expected that each share sold would raise about £2 for the firm. But such was the frenzy of buying of dotcom shares that, in the few weeks between the issue of the prospectus and the opening of the subscription the advisers realized that each share could probably be sold for over £3. This was a firm whose issue price was raised by 67 per cent between announcement of flotation and the sale of the shares. The effect of this was immediately to increase by one-half the amount of capital raised for any commitment to pay future dividends. An imaginary dividend of 20p per share would have represented a cost of capital of 10 per cent at the original flotation price. At the revised price, the cost would have been 6.67 per cent (20p/£3), a reduction in the unit cost of capital of one-third. Meanwhile, ‘old economy’ firms with a proven track record of satisfying consumer demand found their cost of capital rising. This must have been especially galling for old economy firms who found themselves squeezed out of the FTSE-100 index. Outside the index, their shares became less attractive to fund managers, and fell in price accordingly. Being squeezed out of the index increased their capital costs.

### Questions for discussion

- 1 Imagine that you are a fund manager and you observe share prices in one particular sector rising very rapidly, accompanied by much comment in the press that these companies are going to have a very profitable future. Using the valuation principles outlined in Chapter 11, you personally believe that the shares are severely overvalued already. What policy would you adopt on behalf of your fund and why?
- 2 How would you interpret the ‘dotcom’ phenomenon in the light of the ‘efficient market hypothesis’ discussed in Chapter 26?

### Case Study 3 Efficient markets: contrasting evidence

In Chapter 26 we discussed the widely held belief that financial markets are informationally efficient – participants make the best use of all relevant information in making judgements about the appropriate price at which assets should trade. We also pointed out that this hypothesis is often combined with an unwritten assumption that the information in question is information about ‘fundamentals’, with the result that

markets price assets efficiently and rationally. This is an age-old controversy, not least because the implications (a) appear to conflict with casual observation of the way markets actually behave – with a great deal of volatility – and (b) suggest that many of the specialists working in financial markets are wasting their time in trying to earn superior returns from investment analysis. These two themes are represented in the two

articles reprinted here from the *Financial Times*. The first was written in April 2001, after a sharp fall in stock prices generally and a very dramatic fall in technology stocks in particular (in fact, the article has several connections with issues discussed in Case Study 2). The second was written about a year earlier, when prices were still around their peak. The first casts some doubt upon the EMH; the second tends to support it. But both raise interesting issues which we touch on in Chapter 26, and elsewhere in this book.

The first article states the core of the EMH in the second paragraph and points out that it is usually combined with a supplementary assumption that the information which is being efficiently used is information which is required for a 'rational' valuation of assets. It is not, for example, information about the consumption of Prozac, but information about 'expected earnings per share growth, interest rates and the equity risk premium'. This is information which relates to what is often called a share's 'fundamentals' and it is the sort of information which is necessary in order for capital markets to allocate funds in a socially beneficial way. We discussed the role of 'fundamentals' in the optimum allocation of funds in Sections 11.4, 26.5 and in Case Study 2.

The problem with the EMH for many observers is described in the opening paragraph. Prices seem sometimes to fluctuate by more than could be accounted for by revisions to 'fundamentals'. The 1987 crash is quoted as an example. Later on the article quotes the fate of Cisco Systems and Deutsche Telekom in the recent technology share crash. To explain events like this by reference to the EMH we have either to suppose that radically new information about fundamentals was suddenly discovered, which in return means either (a) that there was an actual shift in fundamentals on a dramatic scale, or (b) that fundamentals had been changing less dramatically for some period of time and this fact had lain undiscovered. The latter seems unlikely because 'These are not speculative minnows but widely-owned giants subjected to high levels of reporting and analysis.' (It is always possible that vital information about small, obscure firms fails to get publicized but these big firms were subject to high levels of continuous, professional analysis.) The alternative, then, is that the fundamentals really did change in quite a big way. But the obvious problem with this idea is that it is impossible to understand why 'they ever went so high in the first place'. What changes in fundamentals could possibly account for this?

The article goes on to consider recent changes in market behaviour which suggest alternative possible explanations. In Chapter 26, we went to some lengths to stress the dual hypotheses which are commonly rolled together under the EMH heading. The efficient use of information itself is not enough to produce the optimum allocation of capital; that requires that the information relates to fundamentals. In the light of this, it is worth noting that in the 'problems at three levels' which the article gives us as contributing to this volatility, there is little suggestion that markets became any less efficient at processing and using information. Indeed, the first 'problem' actually refers to *improved access to information* as the result of financial websites which were springing up across the internet. The EMH, strictly defined, remains intact. But the other two 'problems' clearly suggest that the information that market participants focused on was increasingly divorced from fundamentals. The first of these is that analysts and fund managers became increasingly concerned with *relative* performance and valuation. Thus, provided a share's price looked reasonable relative to others in the same sector, the price was justified. No one was checking whether the whole sector was overvalued in an absolute sense. (We discuss this concern with relative valuation in Section 17.3.2 and the second article also draws attention to it.) Furthermore, the article says towards the end, the performance of analysts and fund managers themselves is increasingly judged in relative terms. A fund manager who can show that he has matched the returns on some index is viewed as successful. The fact that the index may be rising (or falling) for reasons which may not be well founded is irrelevant. Indeed, any manager that tried to be independent would quickly be fired. (We came across this problem from a different direction in Case Study 2.) This second explanation would appeal to anyone familiar with the basic ideas of behavioural finance that we discussed in Section 26.6. Irrational behaviour is frequently correlated. This pushes prices to unrealistic levels. But arbitrage, which is supposed to remove price anomalies, is risky, *especially when there is no satisfactory hedge* (typically the case with whole sectors) and when *the potential arbitrageur faces a short time horizon* (as is the case with the fund managers referred to in the article).

The other problem mentioned is that regulations and market structures became weaker during the boom, so that firms with weak fundamentals were able to get a stock exchange listing.



## Markets behaving badly

Are the financial markets, and their participants, of sound mind? Over the years, perhaps naively, I have generally given them at least the benefit of the doubt, in aggregate . . . One of the fundamental concepts is market efficiency. This implies that prices accurately reflect information generally known and understood (although the quality of that knowledge may vary). There is also a more general economic hypothesis of rational expectations, that individuals anticipate the future in a coherent way. In the stock market this implies that values can be modelled statistically in terms of factors like expected earnings per share growth, interest rates and the equity-risk premium.

Set against these hypotheses, however, are the behavioural theories. These explore much less rational possibilities, such as that people will follow fashions and be influenced by peer group pressures. The explanation for financial manias may be psychological, or even chemical: indeed, recently an American doctor sent me a paper that seriously discussed the possibility that Wall Street's bubble reflected the ever-rising consumption of Prozac which, he said, fuelled over-optimism.

Setting the pill bottle aside, how can we interpret the markets' recent gyrations? After all, the Nasdaq – at its peak the world's biggest exchange – has crashed in value by two-thirds within 13 months. This week it was down 6 per cent on Tuesday, up 9 per cent on Thursday; yesterday it was tumbling again.

Cisco Systems, which for just a day or two during mad March last year was the world's most valuable company, worth \$550bn, has since (at the recent low point) suffered a share-price collapse of 84 per cent. The drop at Deutsche Telekom has been 70 per cent. These are not speculative minnows but widely-owned giants

subjected to high levels of reporting and analysis.

Clearly, confidence in rationality has been shaken although, as is usual in the aftermath of a big fall, the puzzling aspect is not why values have tumbled but why they ever got so high in the first place. From a selfish point of view the distortions have made it easier to predict the future: it is possible to forecast price trends in an inefficient market but in a completely efficient one you never have a better than 50 per cent chance of getting the up-or-down decision right. However, looking at the markets from an economic point of view, they have become distorted and maybe dangerous: capital has been allocated wrongly, with vast sums now being dissipated before our very eyes in ill-conceived internet projects and telecoms over-expansion.

There have been problems at three levels. The one that received the most publicity during the bubble was the enormous increase in stock market speculation during the late 1990s by private individuals; millions were lured into the more fashionable sectors of the equity markets, notably technology. Improved access to information and dealing facilities through the internet fuelled this expanded participation, often by so-called 'day traders'. Rational valuation took an extended holiday.

### Setting the pill bottle aside, how can we interpret the markets' recent gyrations?

Second, professional investors have failed to provide a proper balance. Portfolio managers have been drawn towards relative performance, with the help of increasingly varied and complicated stock market indices, and risk-control models. Thus Vodafone, which accounted for 13 per cent of London's All-Share Index at one stage, was generally regarded as a low-risk holding relative to the index, whereas in absolute terms it actually carried a high risk, though with a share price down 'only' 51 per cent it has not turned out to be as risky as some (not yet, anyway). Fund managers who held out against the irrational fashions of 1999 and early 2000 faced a big risk of being washed away by the tide, although if they survived they will have performed very well recently.

Third, the market's institutional structures have become unstable. Investment banks, and their executives, became irresponsibly greedy, a trend that culminated in the wave of flotations of immature companies, often scarcely past the start-up stage. Stock exchanges, sometimes themselves new, competed aggressively for the quotations of these unproven and risky enterprises, degrading their own listing standards in the process. Quality was abandoned. Now we read that the Neuer Markt is having trouble persuading some of its listed companies to report their results within its three-month time limit. Accounting standards have become seriously distorted, in the US technology sector at any rate, by the huge handouts of stock options. Many of those options are presumably now worthless, but that poses the problem that workforces no longer locked in will crumble away.

Amid all the hysteria the community of investment analysts, with some honourable exceptions, was focused on keeping the bubble inflated. In the technology sector, earnings forecasts were hoisted higher and higher . . . Again, as with portfolio managers, an important problem is that analysts are chasing relative accuracy: in this case, how far their forecasts diverge from the consensus, rather than whether they turn out to be right or not in absolute terms. Only the ones who stray away from the herd feel vulnerable.

A nasty bear market has been needed to resolve these many distortions and, of course, it has all happened before. Perhaps it is disappointing that better information and technology have not really helped the capital markets to operate more reliably. Perversely, facts and analysis, however vast the quantity, can more easily be brought to bear to justify wrong prices than to generate correct ones.

A full post mortem on rationality will have to wait until the dust has settled. My interim report is that human nature, often dominated by short-sightedness and greed, will always be the most important factor. The efficient market hypothesis must co-exist with behavioural theory.

Source: Ben Hunt, *Financial Times*, 7 April 2001.

## FINANCE WEEK: It takes a cracker . . . : Tracker funds look the better bet but even they have problems

FT

### THE LONG VIEW

It's a simple point, but evidently one well worth repeating. For the second year running Virgin Direct has hired the Edinburgh-based performance measurement experts WM to do a demolition job on active managers of UK unit trusts. Virgin, if you need reminding, only runs a 'passive' fund that tracks the FTSE Actuaries All-Share Index using a fixed formula and computerized technology rather than the ace stockpickers employed by most unit trust companies.

Well, they are supposed to be aces. Right now huge sums are cascading, for instance, into fashionable technology funds. Top-performing funds are heavily promoted, especially with the tax-favoured Isa sales season nearing its peak. But most of this churning of portfolios is a waste of effort. WM has examined data on the UK All Companies unit trust and open-ended investment companies (OEICS) sector going back 20 years. Out of 58 funds that survived for the whole period only seven outperformed the All-Share Index. As for the performance of those that fell by the wayside, usually through mergers – don't even ask.

Not that tracker funds provide a perfect alternative. Only two have even been around for more than 10 years. They all underperform the index, too, if only slightly, because they have costs, which the index does not. However, WM has worked out that over any recent five-year period investors in an active fund had no better than a one-in-four chance of beating the return of a tracker fund. Over longer periods the active funds tend to fall away even more.

But won't you be all right if you pick the right fund? That is how

fund promoters and financial advisers justify their activities (and commissions). But the statisticians at WM have searched for persistent performance and have struggled to find any. The best they can say is that good performance by top quartile active funds tends to be clustered in three-year sequences. The central year features an average of 6 per cent outperformance, with another 1.5 per cent the previous year and the same again the year after.

This is interesting as an indication of how long particular investment styles tend to work. The trouble is, investors cannot spot the opportunity until year two. And since it usually costs 5 or 6 per cent to switch between unit trusts it will hardly be worth their while to chase these temporarily successful funds.

But surely a fund that has performed well over a decent period of, say, five years has demonstrated its quality and durability? Unfortunately, WM's analysis shows that such funds have only performed with random results in subsequent five-year periods. Brilliant investment teams tend to break up (or their luck runs out). There can also be important momentum effects in unit trusts. The successful ones draw in heavy inflows of new money, which tend to push up the prices of the managers' favourite stocks. But the funds become too big to be managed easily, money starts to leave and the whole process can go into reverse.

There is now a phenomenal momentum effect in the technology sector which has developed into an astonishing bubble. It may still have some distance to run, but when

it tops out the downside risks will be enormous, and the fund managers, however brilliant, will not be able to do much about it. The unit trust industry has always found it much easier to sell yesterday's fashions than tomorrow's winners.

Virgin Direct's not entirely independent advice is that you should stick to tracker funds as the core of your portfolio, and if you dabble in active funds at the margin it will not matter so much if they disappoint. But there are potential problems with tracker funds. They depend on a continuing bull market in equities: they will track an index downwards just as remorselessly as upwards.

There are also fashions in tracking. Several years ago several unit trust managers launched funds that tracked the better-known and smaller (and therefore cheaper to track) FTSE 100 Index rather than the more cumbersome All-Share. For a while the Footsie surged ahead of the All-Share, partly because of the new tracker money chasing the market leaders – but last year the Footsie underperformed by 4 per cent and it has continued to lag. Moreover, marketing men will develop the tracking concept through funds matching global multinational indices, SmallCap indices and the Techmark Index, among others. Picking the right index could become as tricky as picking the best active manager.

Anyway, indices can contain their own booby-traps. This is especially so when a growing volume of tracking money is reinforced by 'closet index' funds, the supposedly 'active' portfolios that hug the indices so that managers can control their risks against their benchmarks.

We are seeing a powerful Vodafone effect, with the weighting of the mobile company pushed up to 15 per cent of the Footsie (and even 12 per cent of the All-Share). There is an eruption of new issues with low free floats (that is, most of the stock remains unavailable, as nearly 80 per cent does at lastminute.com, for example) and a growing fashion for Freeserve-style partial spin-offs of subsidiaries, creating what used to be called pyramids.

Just four sectors now account for more than 60 per cent of the Footsie Index, and 10 individual stocks account for 50 per cent. The degree of

concentration is making index tracking riskier, and the Vodafone effect means even the All-Share tracker unit trusts are in breach of the standard statutory risk control, a 10 per cent ceiling on each individual investment.

Wednesday's quarterly index updating resulted in an unprecedented nine changes to the 100 constituents of the Footsie, and 38 to the mid-cap 250 Index. One interpretation of this turmoil is that investors are adapting to the New Economy; another is that enormous index-related distortions are largely responsible. Modern indices were invented to measure investors, not drive them.

The risks of tracker funds are still not nearly as great as for active funds, however. Last year broke all recent records for variability, and investment returns on the 232 funds measured by WM varied between 102 per cent and 6 per cent. There is evidence that some active managers are taking big risks in order to beat the index-matching competition.

You need a cracker to beat a tracker. But you will be very lucky to find one.

Source: Barry Riley, *Financial Times*, 11 March 2000.

And the costs of all this? As we said in Section 26.5, the optimum allocation of funds requires the most effective use of information and that it be related to fundamentals. If either of these conditions fails, then funds could go anywhere. Unsurprisingly in the circumstances described here, 'capital has been allocated wrongly, with vast sums now being dissipated before our very eyes in ill-conceived internet projects and telecoms over-expansion'.

The second article applies a rather more formal test to the EMH. Recall that the 'strong-form' of the hypothesis asserts that *all* relevant information (past, current public and even current private information) is incorporated into market prices so quickly that no one can benefit from privately obtained information. The sort of private information envisaged is the information that can be obtained only by very close, professional scrutiny of individual firms and their markets. This is the sort of work which is carried out by analysts on behalf of fund managers. An obvious test of this version of the EMH (as we point out in Section 26.4) is therefore whether fund managers can obtain returns which are consistently better than would be obtained by simply buying and holding a diversified portfolio of shares such as those which make up an index.

Virgin Direct is a mutual fund which operates only one type of fund. This is described as a 'passive' fund because it requires very little management and very little buying and selling of shares. This is because the fund is 'formula driven', where the formula is some chosen index. In Virgin's case it is the FTSE All-Share

(which we know from Section 17.5.3 means that the fund consists of about 800 shares). The quantities of each are held in the same proportions as they appear in the index, so that the Virgin Direct fund can be regarded as an accurate, but miniature, replication of the All-Share Index. Passive funds are often known as 'tracker funds', because their performance is bound to track or follow exactly the performance of the index. They are popular because, being formula driven, they are cheap to run. No stock selection is necessary and no expensive analysis is required to justify the selection. (In Section 3.6 we explain that one way in which clients pay the managers of unit trusts is via a 'spread' between buying and selling prices, often of around 5 per cent. In tracker funds, this spread is commonly zero.)

Such tracker funds, therefore, provide one essential part of a test of the benefits of active management. They provide a benchmark.

The article reports that Virgin Direct commissioned the WM company to examine the returns to investors from investing in broad-based actively managed unit trusts and OEICS (see Chapter 3) and compare them with those from tracker funds. The comparison was to be made on a 20-year sample, in order to rule out short-term 'chance'. There were only 58 such funds in existence for the whole 20-year period and only seven of these produced better returns than would have been achieved by 'holding the index'. The evidence suggests that the EMH (or at least one of its implications) is correct.

On the face of these results, one might imagine that the appropriate investment strategy is to buy a tracker

fund and forget about it. Furthermore, it might be thought that it does not matter which, since each fund tracks a broad-based index and there is no room for management skill (or lack of it) to make any difference to returns. But most of the article goes on to explain that things are not so simple.

Firstly, the returns from all tracker funds fail to match those from the index on which they are based. This is because some management costs remain. (An annual management charge of around 0.5 per cent is deducted from the income to the fund.)

Secondly, while it maybe a virtue of tracker funds that there is no room for management discretion, this does mean that when an index is falling, the managers have no option but to stay invested in the shares that are declining. They cannot, for example, sell shares and hold money until the decline stops. (The article was drawing attention to this in March 2000 when investors had no experience of tracker funds in falling markets.)

Thirdly, there is the question of which tracker fund to choose (in effect a question of which index to follow). The common assumption is that all tracker funds are widely diversified and therefore have relatively low risk (for the reasons we discuss in Section 8.3). But, the article points out, some indices are larger than others. The FTSE Actuaries All-Share gives, by definition, the greatest degree of diversification available from investing in UK stocks. By contrast, the FTSE-100 contains only 100 shares and these, in March 2000, were heavily skewed towards technology stocks because the recent fashion for TMT shares had turned some of these firms into the largest UK companies. Investing in a FTSE-100 tracker fund meant putting 15 per cent of your portfolio into the single firm, Vodafone, and half of one's portfolio would be in just 10 stocks.

Even so, as the article concludes, this is a lot less risky than investing in an actively managed fund, especially if the fund concentrates upon a particular sector, or particular region. And one pays less for it.

### Questions for discussion

- 1 What does the article mean when it says that 'rational valuation took a holiday'?
- 2 Why does concentrating upon *relative* valuation encourage 'irrational' valuation?
- 3 Explain what is meant by a 'tracker fund'. What are its supposed advantages from an investor's point of view?
- 4 What was the problem (in 2000), according to the *Financial Times*, in investing in a tracker fund based upon the FTSE-100 index.

## Case Study 4 Trends in retail banking

### House prices, wealth and monetary policy

In 2003 the price of the average UK house increased by about 16 per cent. According to the Nationwide Building Society this was the eighth year in succession that prices had risen and for most of those years the rate of increase had been in double digits. By the beginning of 2004, the average price was 170 per cent higher than it had been in 1996 and prices were still rising at an annualized rate of 17 per cent in the first quarter of 2004, even after four increases in UK official interest rates. Not surprisingly, the housing market attracted a great deal of attention in the media and eventually, on 14 June 2004, the Governor of

the Bank of England warned that house prices were historically high and might be about to fall. The *Financial Times* report is reproduced below. Looking at media coverage in more detail shows that there were five issues that concerned commentators:

- the possibility that the 'boom' in house prices must end in a dramatic 'bust';
- the possibility that the boom would encourage the Bank of England to raise interest rates;
- the widespread use in the UK of variable rate mortgages.
- the increasing difficulty that young people were having in buying their first house;
- the general shortage of appropriate housing.

Of these, the first three are closely connected with the functioning of financial markets and with the setting of interest rates. Each illustrates a major issue that we have discussed earlier in this book. We take them in turn.

A rapid and sustained rise in house prices has the same effect as a rise in any asset price – it makes the owner richer. There is a bit of a problem with houses in the sense that most people require housing services and therefore it is difficult to sell this particular asset in order to ‘realize’ its market value. Most people can sell their house only in order to buy another (which is also rising in price). The only obvious gainers are those who own several houses, those who are planning to ‘trade down’ by selling and buying a smaller (and cheaper) house and those who inherit a house which they do not intend to hold. The clear losers are those who wish to buy but do not have a house to sell. (This is the problem raised by the fourth heading above.)

But much more than with financial assets, it is very difficult to know when houses as a class of assets are ‘overpriced’ and even then it does not follow that a price correction has to be dramatic. The question of overpricing obviously involves comparing two magnitudes: firstly, the current price of the asset and then the ‘correct’ value arrived at by some rational valuation process.

The figures we quoted above are taken from the Nationwide Building Society which gets its data by recording the transacted price for every house on which it grants a mortgage loan. But there are rival indices which we could have used. These are produced by the Halifax (a mortgage bank), the Office of the Deputy Prime Minister (ODPM) and the UK Land Registry and the Royal Institute of Chartered Surveyors. The fact that several indices exist should alert us to the fact that there are rival methodologies being employed so that methodology at least is problematic. We come back to this in a moment. More immediately we need to realize that houses are not heterogeneous goods. They come with many different characteristics and they are fixed and immovable across all the regions of the UK where economic conditions can vary considerably. Furthermore, the price at which a house is actually sold (‘transacted’) may differ significantly from the ‘asking’ price since the procedure in the UK is for the buyer and seller to negotiate. This is why, as we saw above, the prices that are used are normally transacted prices. This introduces a big difference from, say, the

FTSE All-Share price index. This includes the prices of all shares quoted on the London Stock Exchange, regardless of whether they have just been bought or sold. A price exists independently of the transaction. But if, as with property prices, a price is only available for properties transacted in the survey period, then changes in the *pattern* of transactions will affect the index. If more ‘executive style’ houses are transacted, for example, or more houses in the (high price) southeast of England the index will rise. If one index gives a greater weight to houses in one area or of a particular type than another, then house price movements in that area will have a larger effect than on another index. (The ODPM index showed consistently lower house price increases than other indices in 2003 and 2004 because it contained a greater concentration of houses in London and the southeast where prices were scarcely rising at all.) Furthermore, the housing stock tends to improve in quality over time. Central heating is now standard in a new house and people today increasingly look for a second or an ‘*en suite*’ bathroom. Some of the upward drift in transacted prices is therefore capturing this improvement in quality. As a rough generalization, the different indices listed above differ in their approach to handling these problems (details can be found in the *BEQB* article listed in ‘Further reading’).

On the other side of the comparison, there are problems in identifying the ‘correct’ value. In Section 11.3 we saw that bonds and equities are valued by discounting their future income stream by a risk-adjusted rate of interest. Although there are differences in detail in the calculations, the principle is the same and, indeed, as a principle it applies to the valuation of all assets. The first problem in valuing housing, compared with financial assets, is that there is no explicit income stream. The valuation of housing requires us to place a value on the flow of ‘housing services’ provided by the housing stock. One way of tackling this problem might be to look at the level of rental income that can be expected from different types of residential property and then to adjust for the composition of the housing stock. But the rental market is affected by many factors which may make the actual rent paid a very poor indicator of the value of housing services. For many years, sections of the UK market were subject to ‘rent control’ which held rents below the market clearing level. Today, housing associations enjoy tax advantages which encourage them to provide ‘social housing’ – housing which is let at low

rent to families that qualify. In 2004, some investment banks began calculating price:rental income ratios. This is analogous to the price:earnings ratios used for share valuation that we discussed in Section 17.3. When UK equities were showing a P/E ratio of c.17 in early 2004, the banks' P/R ratios for residential property were in the 40s, suggesting that houses, as assets, were overvalued relative to equities.

An alternative to trying to estimate a value of housing services is to assume that, whatever it is, it is constant in real terms. Thus, if house prices rise more rapidly than other prices then they are becoming overpriced relative to other assets. But this raises the question of which other assets form the appropriate comparator. Are houses becoming overvalued if, as happened between 1996 and 2000, house prices and equity prices rise similarly? And this is assuming that the value of housing services is constant, which it may not be if people's tastes change. After all, one might argue that housing services, for most people, used to consist largely of the benefits of shelter but that today houses are partly an expression of wealth, fashion etc.

It is these problems with putting a figure on the equivalent of an income stream that has resulted in valuation of the housing market resorting to 'rules of thumb'. The first of these is often the ratio of house prices to average incomes. When the Governor of the Bank of England warned that house prices might be too high (see below) he compared the current ratio of 5 times with a 50-year average of 3.5 times average earnings. On this basis, the housing stock looks overvalued and this view is strengthened when one notes that the current ratio is already above its previous peak in 1989, which was followed by a sharp decline in house prices. However, one might argue that the only reason why the ratio of house prices to earnings is relevant is that it is a measure of 'affordability'. Clearly there must come a point at which people's earnings are not sufficient to sustain the rising level of prices. But this ratio overlooks the fact that for many people a major part of the cost of house purchase is the rate of interest they have to pay on their mortgage. In 1989 mortgage rates were about 15 per cent, nearly three times the level of 5.5 per cent in early 2004. Thus one part of the cost of house purchase is much less than it was. This is reflected in the second rule of thumb, which is the ratio of mortgage interest payments to earnings. At about 20 per cent now, this ratio is considerably lower than the peak of 28 per

cent in 1989. The reason that the interest:income ratio has remained as low as it has is that inflation and interest rates have been low since the mid-1990s. If homeowners are assuming that this is a permanent (or at least a long-term) state of affairs, then the rise in the price:earnings ratio may not be a cyclical phenomenon at all, but the sign of adjustment to a new higher equilibrium level of house prices relative to other assets. In March 2004 a member of the MPC, Kate Barker, reported to the Bank on the housing market in the UK. The main finding was that there was a physical shortage of housing since new house building had lagged behind the rate of formation of new households for many years. If this is the case, then it is highly likely that the general level of house prices must rise relative to that of other assets as a long-term trend and reinforces the idea of adjustment to a new equilibrium level.

In November 2003 the Bank began pushing up interest rates gradually, by 25 basis points at a time, and introduced the fourth increase in June 2004. Raising the ratio of interest payments to earnings will eventually slow the demand for mortgages and thus the demand for housing but no one knows with certainty what level of interest rates is required for this. In May 2004 the Council of Mortgage Lenders (a trade body representing banks and building societies) caused a stir by speculating that interest rates might have to double (to c.10 per cent) in order to bring price rises down to single digits. Although it was a speculation (not a recommendation) it did draw attention to a fundamental consideration, which takes us back again to our earlier discussion of asset valuation in this book. This is that if the return on an asset exceeds the cost of the funds used to purchase it then (ignoring tax and transaction costs) the investor receives an increase in *net wealth*. So if house prices are rising at 15 per cent per annum, then it makes sense to buy, provided that the mortgage rate is less than 15 per cent per annum. In practice, however, the brake might begin to operate at lower rates of interest because the return on houses comes in the form of a capital gain which, as we have said, for most people is difficult to realize. This poses a potential *cashflow* problem for many borrowers. While it is true that their *net wealth* is increasing provided that the increase in the value of the house exceeds the mortgage interest rate, they have to pay the mortgage interest out of their current income. The rise in capital value of the house is no help in making these payments. Households could find they

are unable to service the debt long before the mortgage rate matches the rate of price increase. Once again, this contrasts with other assets where the return often comes in the form of income which can be turned into cash which will pay the interest. This is typically what happens when a firm invests in new equipment: the interest on the loan is paid for out of the additional income generated by the project.

The question that obsessed most of the media was whether a slowdown in increase would necessarily precede a fall or whether the rise in interest rates would bring about a 'soft landing'. The two threats to this controlled stabilization are firstly psychological – the possibility that people see the *slowing of the rise* as heralding a *fall*. Given the media's obsession with

house prices and their continuous search for exciting headlines this could conceivably happen. Careless journalism regularly confuses a change (e.g. a fall) in the *rate of change* with a decline in the *absolute level*. If homeowners are already worried about the latter it is easy for them to read what they half expect to read. But we should remember that prices can only fall if people decide to sell and for most people this is not an option. Housing services are a necessity. The second threat is that the economy enters a recession, borrowers become unemployed, cannot service their mortgage and their homes are re-possessed and sold. This is what happened in 1989. But conditions are very different now. Look again at the Governor's remarks. The reason that the Bank is raising interest rates is the

## BoE chief warns on house prices



By Scheherazade Daneshkhu, Economics Correspondent

Mervyn King, the Bank of England governor, last night issued a clear warning to housebuyers of a growing risk that house prices could fall.

Speaking to the CBI in Scotland on Monday night, Mr King indicated that interest rates could rise faster than market expectations. 'Anyone entering or moving within the housing market should consider carefully the possible future paths of house prices and interest rates,' he said.

Mr King suggested that houses may be overvalued. 'After the hectic pace of price rises over the past year it is clear that the chances of falls in house prices are greater than they were,' he said. He made no mention of the Bank's central view that house price inflation would fall to zero over the next two years.

The resilience of the housing market has continued to defy expectations. After slowing last year, annual house price growth has accelerated to 20 per cent.

There were many risks to robust economic growth in the UK this year, Mr King said, but he singled out the housing market. The ratio of house

prices to earnings was at record levels and was now 'well above what most people would regard as sustainable in the long term,' he said.

At five times earnings house prices are high compared with the long-term average over 50 years of about 3.5 times. Mr King painted a picture of a broad-based rise in cost pressures, with little spare capacity in the economy to mop up inflation.

'How far interest rates will need to rise to keep inflation on track to meet our 2 per cent target for consumer price inflation in the medium term is impossible to say with any degree of confidence,' he said.

The Bank last week stepped up the pace of interest rate rises by increasing its main rate by a quarter-point for the second month in succession, to 4.5 per cent. It has raised interest rates four times since November.

Mr King has stressed the importance of avoiding surprising the market without good reason and in recent months the Monetary Policy Committee has been more outspoken about what it thinks the likely path of interest rates will be.

'The MPC has done a good job in shaping market expectations,' said Philip Shaw, economist at Investec bank. Futures market rates suggest the Bank's main rate will end the year at 5.25 per cent and peak next year at 5.75 per cent. Expectations have moved sharply upwards since January, when the market had priced in rates ending the year at 4.25 per cent and peaking at 5.25 per cent at the beginning of 2006. Mr King's comments last night may suggest he thinks futures market rates are still too low. Mr King cited a rise in jobs in the US and a pick-up in demand in Japan and the euro area as evidence of a synchronised recovery in the rest of the world. 'As a result the world interest rate cycle has now turned,' he said.

A Royal Institution of Chartered Surveyors' poll today said interest rate rises and the fear of more rises had started to cool buyer demand, and surveyors' optimism was at its lowest since July.

Source: *Financial Times*, 14 June 2004.

rate of economic growth, picking up throughout the world. This brings us to the second issue – the Bank of England's interest rate policy and the role of house prices in the decision making.

In Section 17.4 we saw that most central banks now focus their policy instruments on achieving a low rate of inflation as a first priority. The Bank of England's 'remit', given to it by the Chancellor of the Exchequer in the Bank of England Act, 1998, is

- (a) to maintain price stability, and
- (b) *subject to that*, to support the economic policy of her majesty's government, including its objectives for growth and employment. (www.bankofengland.co.uk/mpc/ our emphasis).

Notice that the rate of inflation takes priority over all else. The Bank is not required to concern itself with the state of manufacturing industry or exports or the rate of increase in house prices. Notice in the *FT* extract that the Governor is warning people that interest rates are going to have to rise *in order to combat inflation* by an amount which is uncertain. House prices are not the cause of this, but they could be a future casualty. When the Bank's remit was last renewed (in December 2003) the Chancellor defined price stability as an annual rate of increase in the consumer price index (CPI) of 2 per cent. The CPI does not even include the purchase price of housing. (It includes the cost of depreciation – i.e. maintaining the housing stock in its present state.)

From this, it is reasonable to suppose that when or if the Governor and the MPC interest themselves in the behaviour of house prices it is because they see this behaviour as having some *indirect* effect on their ability to hit the inflation target. Another glance at Section 14.5 (and especially Figure 14.3) shows that they are aware that changes in asset prices affect people's wealth and this may feed through to the level of aggregate demand. The relevance to the Bank of England of a boom in UK house prices is that it may encourage domestic demand and add to inflationary pressure at some time in the future. There are three ways in which this may happen.

The first is that people *feel* wealthier. If we assume that many people have a target level of savings which they hope to achieve over a lifetime of working (especially possible if they are uncertain about the value of their pension scheme (see Section 3.5)) then a steady rise in housing wealth may persuade them

that they can afford to consume a higher level of their income. The fact that the wealth cannot be easily realized may not matter too much if the owner is thinking only about retirement when it might well be possible to move to a smaller house, perhaps in a cheaper part of the country.

The second way in which rising house prices may feed through to higher consumption is that housing wealth can act as security (or 'collateral') for a loan. We have noticed throughout this book that risk and return tend to move in opposite directions. Thus a loan which gives the lender a claim on a specific asset is usually much cheaper than an unsecured loan. However, the value of an asset can only be used once as security. Thus if a borrower has a mortgage of £90,000 on a house valued at £100,000 then 90 per cent of the house's value has already been used. But if, in the next few years, the value of the house doubles a 'second mortgage', up to a value of £110,000, can be taken out at a relatively low rate of interest. Notice that there is no requirement that mortgage loans must be *used* for house purchase, only that they are secured on the value of the property.

This leads us to the third way in which consumption spending can be encouraged by a rising housing market. This is known as 'mortgage equity withdrawal' (MEW) and occurs where a person borrows more than they need for the purchase of a property, leaving them to spend the balance of their savings in any way that they choose. Let us go back to our example of the £100,00 house whose value doubles in the space of a few years. Suppose now that the owner decides to sell in order to move to a new house with a market value of £250,000. S/he sells his or her house for £200,000, pays off the mortgage and (ignoring transaction costs) has £110,000 left over, known as the 'equity' interest in the house. If the new house costs £250,000 then s/he requires a mortgage of £140,000 (£250,000 – £110,000). But the house will act as collateral for a mortgage approaching £250,000. Suppose that the borrower takes out a mortgage for £160,000. S/he then needs £90,000 out of the £110,000 in order to complete the purchase which leaves him or her with surplus funds of £20,000 that can be used for any purpose. Like the second channel, a relatively cheap mortgage loan is being used to finance consumption spending. According to the Bank's estimates, MEW reached a record level in the last quarter of 2003, amounting to 8.3 per cent of household income.



The third issue relating to the housing market in the last few years has been the reliance of most housebuyers upon a mortgage loan on which they must pay a variable rate of interest. This obviously exposes them to considerable interest rate risk. As we have just seen, when the central bank begins to raise interest rates, mortgage rates follow and households find a larger and larger proportion of their income being pre-empted by their contractual obligation to pay their mortgage interest. The larger is the loan in relation to income, the bigger is the effect of a unit increase in interest rates. This gearing effect is going to be much bigger in future with the loan:income ratio of c.5, compared with the long-term 'norm' of 3.5.

If more buyers took out fixed rate mortgages, the effect of changes in interest rates on households' discretionary income would be less. A change in interest rates would apply to new borrowers, though even here the effect would be muted by the fact that long-term rates tend to be more stable than short-term rates. Existing borrowers would be protected. On the downside, at any particular time long-term interest rates tend also to be higher than short-term rates (see Section 16.5).

In 2003, the UK Chancellor of the Exchequer commissioned Professor David Miles to report on how Britain could develop long-term fixed rate mortgages. The Chancellor's interest seems to have been aroused by discussions over the UK's possible entry into the eurozone. In continental Europe, fixed rate mortgages are much more common (as they are in the USA). This means that the impact on households of a change in the ECB rate is less than it would be for households in the UK. If the ECB needed to embark on a vigorous series of interest rate increases with the UK as a member of the monetary system, UK households would be very badly hit. In June 2003 the Chancellor ruled out entry to the euro partly on the grounds that the housing market made the British economy more sensitive to interest rate changes than the eurozone. Persuading people to switch to fixed rate mortgages would therefore be a valuable step towards the 'convergence' of the UK and the eurozone economies.

The Miles Report argued that part of the reason that fixed rate mortgages were unpopular was that UK borrowers were 'myopic'. This is a problem that we first met in Section 2.4.3 and it means that people concentrate too much on the present and not enough on the long term. Thus with mortgages, borrowers

look at the range of products on offer. They observe that long-term (fixed) rates are generally higher than short-term (variable) rates and assume that the former must therefore be expensive. But they do not appreciate what we saw in Section 16.5.1, namely that long-term rates are an average of expected short-term rates. If expectations are correct, then over the lifetime of the mortgage there should be little difference in total cost. Furthermore, even if a mortgage at a long-term fixed rate turned out to be more expensive than its variable rate alternative, the fixed rate mortgage gives a degree of certainty (about future interest payments). As we all know, this absence of risk is something for which people would be prepared to pay if they did but recognize it. Some effort, therefore, should be put into explaining the merits of fixed rate products.

In addition to arguing for better education Miles criticized strongly the practice of mortgage lenders of offering 'discounts' on new mortgages (which were almost always at a variable rate). This meant that borrowers in, say, the first five years of their contract paid a lower rate of interest than established customers. This obviously encouraged established borrowers to pay off their existing mortgage and switch to a new lender as soon as the discounted rate came to an end. This cross-subsidy of new borrowers had the effect of concentrating demand on variable rate products and Miles argued that it should stop.

Finally, we know that intermediaries' uses of funds must be linked to the sources of those funds. There is only a certain amount of maturity transformation that they can do and they have to maintain some balance between assets and liabilities when it comes to the fixed/variable rate proportion. For example, if a bank has only variable rate liabilities – deposits on which the rate varies with changes in the official rate, for example – while its assets all pay a fixed rate, then the bank is terribly exposed to interest rate risk. Its profits rise if interest rates fall but they fall when interest rates rise. In practice banks and building societies tend to have a slightly higher proportion of fixed rate assets than fixed rate liabilities but the difference is small for obvious reasons. If they were going to offer more fixed rate mortgages, then this would require that they raise a higher proportion of their funds at a fixed rate of interest. In practice, this means issuing more bonds. For building societies this will mean a change in the regulations governing building society finance.

### Questions for discussion

- 1 At the beginning of 2003 the average UK house price was £120,000. During the year, this price increased by about 20 per cent. Calculate roughly the value of this increase in terms of additional monthly income to a household in 2003. How do you think this compares with the average level of 'earned' income per household?
- 2 If a firm were faced with a project which promised a net rate of return of 17 per cent per annum, it would be profitable to invest in this project provided that it could borrow the investment funds at less than 17 per cent (ignoring tax complications). If this principle applied to house purchase, what level of interest rates would be required now to make house purchase unprofitable? Why might this principle *not* apply in the case of house purchase?
- 3 Explain what is meant by 'mortgage equity withdrawal' and why the Bank of England might be concerned about its magnitude?

### Further reading

S Nickell, 'Two Current Monetary Policy Issues', [www.bankofengland.co.uk/speeches/speech202.pdf](http://www.bankofengland.co.uk/speeches/speech202.pdf)  
 G Thwaites and R Wood, 'The Measurement of House Prices', *Bank of England Quarterly Bulletin*, Spring 2003.

The *Miles Review* and the *Barker Review* are available at [www.hm-treasury.gov.uk](http://www.hm-treasury.gov.uk) under the heading of 'independent reviews'.

### Case Study 5 Interest rate changes and exchange rates – interpreting the news

The accompanying article is an extract from the currencies report on the Stockmarket and Currencies page of the *Financial Times* of 14 June 2004 and on [www.ft.com](http://www.ft.com). These daily reports seek to explain events in the foreign exchange market in London on the previous day. This article emphasizes the importance of expectations in markets and the difficulties involved in interpreting news – points discussed in Chapter 18.

Here we have two analysts interpreting the news in entirely different ways and drawing opposite conclusions about the likely future value of the dollar. The news is data on the current account of the US balance of payments – one of the market fundamentals of the exchange rate. Deficits on the current account (imports greater than exports) need either to be reversed or matched by inflows of capital.

This might require a rise in interest rates, generally accepted as good for the dollar. The increase in interest rate provides an arbitrage opportunity. According to the theory, capital should flow into the USA until we have uncovered interest rate parity – defined as

occurring when the gains from investing in a country with a higher interest rate are equal to the expected losses from switching into that country's currency and back into the original currency. Assume we hold a view of the likely future value of the dollar. Following the interest rate rise, the flow of capital into the USA should increase and, as the demand for dollars increases, the value of the dollar should rise. However, once the value of the dollar rises above its expected future value, people will fear capital losses from buying dollars. Once that expected capital loss equals the gain from the higher interest rates in the USA, people will stop buying dollars and the value of the currency will stop rising.

The problem in this article concerns the reason for the worsening US current account deficit. The standard explanation comes from Robert Sinche of Citigroup – increases in demand for cars and consumer goods suggest future inflationary pressures in the economy and a need for the Fed to increase interest rates. On 14 June 2003, the Federal Funds

# Dollar rally reverses on 'alarming' deficit



By Steve Johnson in London



An 'alarming' jump in the US current account deficit brought the dollar rally crashing to a halt yesterday. And just for good measure the data, which hinted that a widely anticipated slowdown in the Chinese economy may already be underway, also sent the yen tumbling.

The US deficit leapt to a record \$48.3bn in April from a revised \$46.6bn in March, dashing hopes for a slight improvement.

Some saw dollar bullish signs in the data. Robert Sinche, head of currency strategy at Citigroup, said the deterioration was due to record imports of cars and consumer goods, pointing to a strengthening US recovery, a hypothesis backed by healthy US retail sales data, also released yesterday.

However Michael Woolfolk, senior currency strategist at Bank

of New York, labelled the data 'alarming, certainly dollar negative'. Mr Woolfolk argued that because the widening deficit was not caused by rising oil prices, as some had predicted, this reduced the need for the Federal Reserve to hike interest rates rapidly in order to contain inflation.

Instead he pointed to a 19.4 per cent month-on-month drop in US exports to China. 'This may be the first credible evidence of a Chinese slowdown,' he said.

This was enough for the dollar to reverse an earlier rally fuelled by further hints that US rates could rise faster than the market has pencilled in. Gary Stern, the president of the Minneapolis Fed, was the latest to drop such hints when he said on Sunday that central banks have a responsibility to control inflation.

Despite the obviousness of Mr Stern's comment, speculation that the Fed could hike rates by 50 basis points on June 30 meant the dollar initially rose to a three-week high of \$1.1956 against the euro, before slumping 1.3 per cent to \$1.2071 on the trade figures.

The yen was also spooked by suggestions of a slowdown in China,

its second-largest export market. The Japanese currency fell 1.8 per cent to Y134.19 against the euro and 1 per cent to Y111.17 versus the dollar.

Despite this, sterling was unable to take much advantage sitting virtually unchanged against the dollar at \$1.8152, firming just 0.8 per cent versus the yen to Y201.71 and falling 0.9 per cent versus the euro to £0.6649.

Sterling was undermined by benign factory gate inflation data, which led James Knightley at ING Financial Markets to question whether UK rates will need to rise to the 5.5 per cent expected by the market.

The pound was also damaged by a ratcheting up of political uncertainty after a poor showing by Tony Blair's Labour party in European elections. While governing parties in eurozone nations also suffered reverses, notably in Germany, yesterday's euro strength demonstrated the single currency's ability to 'disperse country-specific political risk,' said Mr Woolfolk.

Source: *Financial Times*, 14 June 2004.

rate had been left at 1 per cent for almost a year (since 25 June 2003), having been lowered from 6.5 per cent in a series of reductions between May 2000 and June 2003. The question now was how quickly the US economy was recovering from its recession and, thus, how soon the Fed would need to begin again increasing interest rates. If Robert Sinche's view had been correct, the news of the current account deficit should have been good for the dollar.

Early in the day, the market had, indeed, interpreted the news in this way, encouraged by the president of the Federal Reserve of Minneapolis. We are told that market prices had taken account of an

expected increase in the Federal Funds rate at the end of June of 25 basis points (it had been pencilled in) but the comments of the Minneapolis Fed president suggested that interest rates might rise by 50 basis points (to 1.5 per cent). For this reason, the dollar strengthened (rallied) to €1 = \$1.1956.

However, analysts then began to worry about the current account deficit. They noticed the decline in US exports to China and became concerned that this might indicate a fall in demand in China and, thus, a slowing down of the Chinese economy. This would not be good for US exports in the future and would damage the recovery in the US economy. If this happened,

there would be no problem with inflation and no need to raise interest rates. This, said Mr Woolfolk of the Bank of New York, would be ‘dollar-negative’. The dollar promptly weakened to €1 = \$1.2071.

The one piece of news had been used at different times on the same day to justify both buying dollars and selling dollars. The article also contains an example of the problem of interpreting political news.

### Questions for discussion

- 1 Consider the reported comment of the president of the Minneapolis Federal Reserve and discuss the importance of comments by central bank officials. Are markets oversensitive in discovering ‘hints’ in comments by officials?
- 2 How powerful in relation to US interest rate decisions is the president of the Minneapolis Federal Reserve?
- 3 What are the two reasons given in the article for the weakness in the market of sterling?
- 4 In relation to the euro, what is meant by ‘the single currency’s ability to disperse country-specific political risk’? How does the euro differ from sterling in this regard?

### Case Study 6 Monetary policy and the power of expectations

The accompanying article from the front page of the *Financial Times* on 11 May 2001 tells the story of two interest rate cuts, one expected (by the Bank of England), the other unexpected (by the European Central Bank). The background to this case study is provided in the discussion of central bank transparency in Section 14.7.

The Bank of England cut from 5.5 per cent to 5.25 per cent was expected because there had been bad news about the economy. Manufacturing output had fallen during the first quarter of the year and the National Institute of Economic and Social Research had estimated that the economy had grown much more slowly than the Treasury forecast for the whole year might have suggested. Further, this was the third cut made by the MPC in 2001, with quarter-point cuts having been made also in February and April. Before this, interest rates had been unchanged at 6 per cent for 12 months. Thus, the MPC was following what had become an established pattern since 1997 – a series of small rises in the repo rate during booms, longish periods of unchanged rates and then a series of small cuts during economic downturns or anticipated downturns. The markets also knew that in April when announcing the previous cut the MPC had commented that the inflation rate had been well below the then target rate of 2.5 per cent and seemed likely to stay there for some time. In addition, it was known that in the

April meeting of the MPC, three of the nine members had voted for a 50 basis point cut rather than the 25 basis point cut that had occurred. No one voted against an interest rate cut.

The ECB decision was an entirely different matter. The background to this decision is provided in Section 23.5. The May 2001 cut was the first reduction following a series of six increases between February and October 2000, which had taken the ECB’s main refinancing interest rate from 3 per cent to 4.75 per cent. Between October 2000 and May 2001, interest rates had been held steady despite increasing external pressure on the ECB for a cut. As the article notes, the ECB had spent the previous month denying the need for an interest rate cut and arguing that the slowdown in the US economy would have little impact on the euro area economy. Further, the euro area’s inflation rate, as shown by the harmonized consumer price index was 2.6 per cent in March – above the 2 per cent ECB definition of price stability. This was down from the 2.9 per cent reached in November 2000 but there had been no suggestion in the figures for the first quarter of 2001 that there was now a strong downward tendency. The inflation rate had been 2.6 per cent in January and 2.5 per cent in February. Indeed, as we are told in the article, in the month leading up to the meeting of 10 May, ECB members had commented that inflationary pressures were still in evidence in the euro area.

# Interest rates fall across Europe

## ECB move that overshadows reduction in UK that boosts Blair campaign

By Ed Crooks in London and Tony Barber in Frankfurt

The European Central Bank and Bank of England yesterday cut interest rates amid growing concern about the threat of global recession.

Markets were stunned by the ECB's 0.25 percentage point reduction in its main interest rate to 4.5 per cent. It was the ECB's first cut for more than two years and caught investors unprepared.

Wim Duisenberg, ECB president, had come under international pressure to follow other leading central banks in cutting rates, but seemed determined to resist.

Mr Duisenberg said yesterday: 'New facts lead to new assessments and they sometimes lead to new conclusions and that's what happened. It has nothing to do with pressure from inside or outside, from the media or politics.'

Michael Lewis, senior economist at Deutsche Bank, said: 'The market is struggling to understand how ECB policy is devised.'

The Bank of England's 0.25 percentage point cut, to 5.25 per cent, gave Tony Blair fresh ammunition in his fight to make the government's economic record the focus of the election campaign. Leading lenders cut mortgage rates, taking them to their lowest since the early 1960s.

But the Bank's statement explaining its widely expected move pointed to a worsening economic outlook. It said: 'The extent and duration of the slowdown remain uncertain'.

Manufacturing output figures yesterday showed a drop of 0.7 per cent in the first quarter, the steepest fall since the beginning of 1999.

The National Institute of Economic and Social Research estimated that in the three months to April the economy grew by 0.2 per cent, suggesting the Treasury's central forecast of 2.5 per cent growth this year was highly unlikely.

Business groups welcomed the Bank cut. Digby Jones, director general of the Confederation of British Industry, said it would 'steady business nerves without taking risks with inflation'.

The ECB has spent the past month denying the need for a rate cut, saying monetary conditions were not restrictive, the euro-zone's economic growth outlook was solid and inflationary pressures were still in evidence. But Mr Duisenberg said yesterday that the ECB now believed medium-term inflationary pressures in the euro-zone were under control.

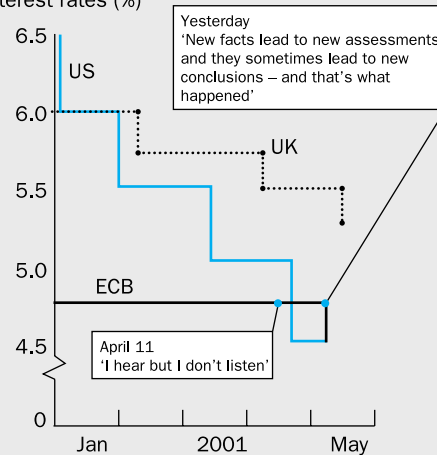
'This is the appropriate level of interest rates to ensure that the euro-area economy will be able to maintain price stability and thereby to contribute to sound economic growth over the coming years.' He also said the rate cut was prompted by evidence, received in the past few days, justifying a lower estimate of euro-zone money supply growth.

Mr Duisenberg stuck to the ECB's line that the US economic slowdown would have a limited impact on the euro-zone, which was still on course this year to grow at or above its long-term average rate of 2.5 per cent a year.

The euro rose after the ECB announcement but quickly fell back, dropping below \$0.88 for the first time in three weeks.

Source: *Financial Times*, 11 May 2001.

Wim joins the club  
Key interest rates (%)



Source: Thomson Financial Datastream.

The inflation rate itself is an important element in the second pillar of ECB monetary policy. The first pillar is the rate of growth of the money supply measure M3 for which the ECB has a reference value of 4.5 per cent. At the time of the rate cut, M3 was growing at 4.7 per cent. This was only very slightly above the reference rate and M3 growth had fallen from a figure of over 6 per cent during 2000. It was also true that in the ECB's April *Monthly Bulletin*, we were told that purchases of negotiable paper by non-residents of the euro area were probably distorting M3 figures upwards and that the growth of M3, corrected for this distortion, was very likely below the reference rate. Nonetheless, ECB spokesmen had during April 2000 said that 'monetary conditions were not restrictive'. Thus, the markets had no grounds from either news about the euro area economy or comments

by ECB members to suggest that an interest rate cut was about to occur. In addition, ECB decisions are much more opaque than those of the MPC of the Bank of England since the ECB does not publish minutes or voting records of the meetings of its Governing Council, which makes interest rate decisions. Nor does it publish an inflation forecast.

Taking all this into account, it was to be expected that the markets were surprised by the decision and that the market was 'struggling to understand how ECB policy is devised'. Even taking into account the post-decision justifications about the state of the euro area economy, it is hard not to believe that the ECB finally succumbed to external pressure despite Mr Duisenberg's comment that the decision had 'nothing to do with pressure from inside or outside, from the media or politics'.

### Questions for discussion

- 1 Explain the statement made by the chief economist of the IMF before the May 2001 interest rate cut that it was time for Europe to become part of the answer rather than part of the problem.
- 2 Which 'new facts' may have influenced the ECB in May 2001 and led to a 'new assessment' and a 'new conclusion'?
- 3 Consider whether it would be desirable for the ECB to publish the minutes and the voting record of the meetings of its Governing Council.
- 4 Why did the euro initially rise but then fall in value following the announcement of the ECB's interest rate cut?

### Case Study 7 The 'who' and 'why' of financial exclusion

Consider the following cases:

- 1 Disabled, unemployed ex-soldier, a seller of *The Big Issue*, who had a government cheque for £17,366 in backdated disability pension and a regular pension. Nonetheless, he was unable to open an account at HSBC, Lloyds, Barclays or NatWest.
- 2 Recently divorced woman with a cheque for £21,000 after the sale of her home, who was turned away by every bank and building society she approached.
- 3 Head of a media agency who had just recently moved jobs in order to increase his earnings but was refused a mortgage.
- 4 Receptionist who did shift work and needed her own transport to get her to and from the office but had trouble borrowing money from mainstream banks and building societies in order to have her car repaired.
- 5 Unemployed artist, 33, who was unable to borrow £180 to attend a two-day course at the London College of Fashion.
- 6 Fifty-three-year-old bankrupt who had suffered two heart attacks and was struggling to pay off several debts including a doorstep loan of £800 with an APR of 80 per cent. He had a bank account but no facility to borrow.
- 7 Lone parent on a run-down northern housing estate who had borrowed £300 for 12 months to buy a washing machine from a finance company that specialized in loans to low income families and who collected repayments weekly from door-to-door. The APR on the loan was 150 per cent and so the £300 washing machine cost £450.

### What do these people have in common?

They suffer from financial exclusion, defined in Box 25.5 as exclusion from financial services of one sort or another: from particular sources of credit, insurance, bill payment services and accessible and appropriate deposit accounts. The reasons for their exclusion are not the same.

In the first three cases, the problem is not a lack of immediate resources. The ex-soldier lived in a housing collective and had neither a driving licence nor a utility bill bearing his name, the usual forms of identification required by banks before they will open an account. He presented his army certificate and letters bearing his name and address from his landlord and local council but none of the banks found these acceptable. A lack of correct identification was also the problem of the recently divorced woman. The media agency head could not get a mortgage because he had had his current job for less than six months. Important questions on all credit assessment forms include the length of time you have been in your current job and at your current address.

The receptionist was unable to borrow because she had had a court judgement against her for debt when she had been much younger. The artist was, of course, unemployed but also, although he had been at his current address for more than a year, he had previously had a period in which he had 'no fixed abode'. The heart-attack victim had been bankrupted and also had a poor health record. The purchaser of the washing machine was rejected by mainstream banks and building societies because of her low income and the fact that she was a lone parent.

In each of these cases, one can understand the position of mainstream financial intermediaries which need to make credit assessments and wish to avoid loan defaults. However, in the modern world in which financial services play such a large part in most people's lives, the costs of financial exclusion can be extremely high, can have a major impact on an individual's quality of life and can make it impossible for those excluded to struggle out of their present difficulties.

#### Questions for discussion

- 1 What are 'doorstep lenders' and 'loan sharks'? How can one justify an APR of 80 per cent or 150 per cent?
- 2 Which features of recent developments in the financial services industry might have increased the amount of financial exclusion?
- 3 To what extent is financial exclusion a social problem as well as a personal one?
- 4 What has been done in recent years to try to reduce the amount of financial exclusion?

### Case Study 8 Financial scandals and the impact on markets: Parmalat

#### A. The Story

Parmalat was probably Italy's best known food company. It was established by Calisto Tanzi who in 1961, having inherited his father's delicatessen, set up a dairy plant near Parma in northern Italy to challenge a then existing Italian milk monopoly. Parmalat became Italy's first producer of branded milk and greatly expanded its market through the production of UHT milk. It expanded strongly, and by 2002 was the fourth largest food products group in Europe with consolidated sales in that year of €7.6bn. It had grown

by gradually moving into new product lines (including yoghurt and fruit juice) and by making a large series of acquisitions, particularly abroad.

Only about a quarter of Parmalat's sales were in Italy; almost two-thirds of total sales were in non-European markets. The group had 37,000 employees, of whom about 4,000 were in Italy. At the end of 2002, the group was composed of 213 companies in 50 countries. The shares of Parmalat Finanziaria, which controlled the industrial firm, were listed on the stock exchange in the 1990s. The company's financial reports were formally audited. The company was well

known for sport sponsorships and had bought the Italian Serie A football club, Parma.

Parmalat accompanied its strategy of expansion abroad with a large-scale internationalization of its financial operations. Acquisitions and investments were financed by entering into debt. Through various group companies Parmalat obtained very substantial financing on the international capital market. Starting in 1997, the group made 32 bond issues for a total of around €7bn. Several leading international banks granted substantial loans and underwrote more than 80 per cent of the group's bond issues. Even in the second half of 2003, top foreign banks continued to purchase Parmalat bonds, for a total in excess of €1bn.

Despite the heavy indebtedness of the company, financial institutions and markets seemed happy with the acquisition strategy. At the beginning of 2003

Parmalat's shares were brought into the index of the 30 largest companies listed on the Italian stock exchange. According to Antonio Fazio, the Governor of the *Banca d'Italia* (2004), in August 2003, nine out of 14 international financial analysts advised investors to buy the company's securities, and another three recommended holding existing investments. In November, seven out of 14 analysts still recommended purchase and two continued to favour holding existing investments. Studies by two international banks were released giving positive judgements on the group's prospects and the relative value of its shares. In the early days of December 2003, the rating still reflected a positive opinion of the company's ability to redeem its bonds.

However, by the beginning of the second week in December it had become clear that Parmalat would

## Lex: Parmalat



Assume the worst, then prepare to be disappointed. First Parmalat's 'liquid' \$590m investment in the Epicurum hedge fund disappeared. Now €3.95bn of securities and cash supposedly held on account by Bonlat, its subsidiary, have vanished into the Cayman Trough. Bank of America has informed Bonlat's auditors that it has no account in that name and denies the authenticity of a document certifying the existence of this rather spectacular amount. Creditors had already called on Enrico Bondi in search of a corporate doctor. They are now dialling 112 for the Carabinieri.

The Cayman Trough is four miles deep. Yet even in this depth of water one might have expected to see the odd ripple from such a spectacular implosion. Parmalat's collapse, however, has sent only the faintest of cat's-paws across the surface of the international capital markets. Parmalat's own shares were remarkably buoyant in the grey market yesterday, as traders were forced to buy in order to cover their short posi-

tions. But the share prices of some Italian banks, which are estimated to be exposed to at least €1bn of Parmalat's €2bn bank debt, have suffered; Capitalia, which has admitted €393m of exposure, dipped 4.6 per cent yesterday, and Banca Intesa, with €360m of exposure, lost 4.1 per cent. The knock-on effect on credit spreads for other issuers has, by contrast, been negligible.

It might be argued that the collapse of a small Italian dairy should have little impact beyond the Gulf of Genoa. Parmalat's debt, however, has found its way into many corners of the financial system. Credit rating agency Moody's found 61 European collateralised debt obligation structures, which repackaged debt into securities with varying ratings and returns, with an aggregate €602m of exposure to Parmalat. Even UK unit trusts have not come out unscathed. Many funds bought the company's sterling perpetuals; for example, it was the second-largest holding in New Star's high-yield bond fund as recently as October.

The whole saga ought, moreover, to reawaken suspicions about the quality of information contained in audited accounts. The same applies to credit ratings – S&P yesterday downgraded Parmalat to D, for default, yet only 11 days ago it gave the company an investment-grade rating.

Some investment bank-dealing desks have taken the opportunity to widen spreads on corporate bonds. However, corporate investment-grade credit spreads are uncomfortably tight, offering only the skimpiest of risk premiums over government bonds. Credit quality may be stabilising, but downgrades still out-number upgrades, and negative credit reviews by the rating agencies have started to tick up again. While investors continue to pour money into the asset class, corporate bonds may still gain ground. But current prices do not give adequate compensation for the risk involved – a risk of which Parmalat provides an all-too-graphic illustration.

Source: www.FT.com, 19 December 2003.



have difficulty meeting a debt repayment to a group of investors who had bought 18 per cent of Parmalat's large Brazilian subsidiary but who had then exercised an option to sell it back to Parmalat following the failure of the subsidiary to be quoted on the Brazilian stock exchange. Parmalat claimed that it would be able to meet the payment by recovering a €500m (\$590m) investment in a mysterious hedge fund in the Cayman Islands tax haven. As the accompanying article suggests, the funds turned out to be non-existent. The company had been engaged in false accounting, the concealment of liabilities, the inflation of assets and the forging of bank statements. It was thought that the fraud (practised for over a decade) could be for as much as \$16.8bn. Parmalat had been using Enron-style accounting to hide liabilities and move money around among subsidiaries but the claimed funds, as in the case of the deposit supposedly held by its subsidiary Bonlat, sometimes did not exist.

The company filed for bankruptcy. Calisto Tanzi was arrested. Questions were asked also about the company's accounting firm, the US-based Grant Thornton, which had audited Parmalat's books until 1999 and had continued to audit the books of Bonlat, the subsidiary with the missing \$4.9bn. Grant Thornton claimed that it had been the victim of a fraud but the head of the Italian branch of the company resigned and his partner was suspended after warrants had been issued for their arrest. As well as the charges in Italy, the SEC in the USA charged Parmalat with fraudulently offering \$100m of unsecured notes to US investors and of inflating its assets by at least \$5bn. In late May 2004, Italian prosecutors sought to have 32 Parmalat executives on trial. However, the Italian legal system often operates extremely slowly and criminal proceedings may take a very long time.

## B. The impact on the markets

At the time of writing, the Parmalat fraud was still being investigated. However, there had been a number of effects on financial markets in the immediate aftermath.

- After the collapse of another large group, Cirio, in November 2002, Italian companies felt that it would be more difficult for them to gain access to the Eurobond market. Consequently, in 2003,

during which bond issues in the euro area were increasing, Eurobond issues by Italian private sector non-financial companies fell to €13.8bn, compared with €19.5bn on average in the previous four years. It was thought likely that this decline would intensify following the Parmalat scandal.

- Following Parmalat, financing conditions worsened in the Euromarket for riskier Italian borrowers, although this seemed not to be true for Italian investment-grade bond issuers.
- The movement of bond prices in the secondary market in early 2004 suggested that investors had become more selective with regard to Italian firms issuing unrated or high-yield securities (those rated below BBB- or Baa3). Average yields on a sample of euro-denominated fixed rate securities of this type rose by about three percentage points between the beginning of December 2003 and the end of February 2004, but this did not happen to comparable foreign bonds. Movements in credit default swap spreads gave much the same message.
- The Parmalat crisis had a significant impact on some segments of the Italian stock market, notably in the food processing sector where share prices (excluding Parmalat) fell by 2.9 per cent between the beginning of December 2003 and the end of January 2004 – share prices in this sector rose in this period in both Germany and France.
- The quality of banks' loan portfolios deteriorated. The downgrading of bank loans to the companies caught up in the Parmalat group's collapse caused the ratio of new bad debts to outstanding loans to rise from 1 per cent to 1.2 per cent and the stock of bad debts to rise from 4.5 to 4.7 per cent of total lending.
- According to the *Banca d'Italia*, the Parmalat collapse would not have a serious direct impact on the Italian banking system. In November 2003 Italian banks' exposure to companies controlled by the Tanzi family came to around €3bn. However, the loans were highly fragmented, involving at least 120 intermediaries, and were commensurate with the capital base of the banks. The loans of the ten Italian banking groups most exposed to Parmalat amounted to 2.3 per cent of their supervisory capital. The EU limits on risk concentration (the *Large Exposures Directive* – see Box 21.2) had been respected.

- However, the Parmalat collapse had serious consequences for its bondholders. In the aftermath of the collapse, Parmalat bond prices fell sharply from around par to about 20 per cent of their nominal value. The impact on savers was greater because of the lack of development in the Italian financial

system of the securities sector. This means that it is not easy for Italian investors to spread their holdings of shares and bonds among various issuers. This, in turn, makes savers highly vulnerable to the collapses of individual firms.

### Questions for discussion

- 1 According to the Governor of the *Banca d'Italia*, 'The Parmalat affair is the outcome of the repeated perpetration of criminal acts in the management of the company. The circumstances surrounding the case once again show that failure to observe the law and the lack of a firm ethical base for the conduct of economic agents can be a serious impediment to the functioning of the economic and financial system' (Fazio, 2004). Discuss the problem facing regulators, in the light of:
  - (a) the importance of consumer confidence to financial markets, but
  - (b) the concern of financial markets regarding overzealous and costly regulation.
- 2 How has financial regulation been changed in the USA and Italy in response to the Enron, Worldcom and Parmalat scandals?
- 3 In a leading article on 23 December 2003, the *Financial Times* said that rating agencies in the Parmalat affair 'carry responsibility for their sheer gullibility'. Do you think this is a fair criticism? (See the letter in reply on 24 December 2003 from the Executive Managing Director of Standard and Poor's in Paris.)
- 4 What has happened in relation to the Parmalat scandal since June 2004?

### Further reading

*Economic Bulletin*, 'The single monetary policy, financial intermediaries and markets in the euro area and Italy', 38, March 2004, 56–77 (Rome: *Banca d'Italia*)

*Economic Bulletin*, 'The impact of the Cirio and Parmalat crises on the market for Eurobonds issued by Italian non-financial companies', 38, March 2004, 72 (Rome: *Banca d'Italia*)

A Fazio, 'Fact-finding with regard to the relationship between firms, financial markets and

the protection of savings', *Economic Bulletin*, 38, March 2004, 87–100 (Rome: *Banca d'Italia*)

#### Websites

[www.ex.ac.uk/~RDavies/arian/scandals/](http://www.ex.ac.uk/~RDavies/arian/scandals/)  
[www.ft.com](http://www.ft.com)  
[www.guardian.co.uk/parmalat/](http://www.guardian.co.uk/parmalat/)  
[news.bbc.co.uk/1/hi/business/](http://news.bbc.co.uk/1/hi/business/)  
[www.unobserver.com/](http://www.unobserver.com/)

## Glossary of terms

### *Accrued interest*

The interest that accrues to the seller of a bond between the last coupon payment date and the date of sale. It is paid to the seller by the buyer and makes the difference between the clean price and the dirty price.

### *Adaptive expectations*

Expectations formed on the basis of the average values of past events.

### *Adverse selection*

The situation where the demand for insurance comes mainly from those most likely to produce the outcomes insured against.

### *Agency capture*

The situation where a regulatory process is 'captured' by those it is supposed to regulate and turned to their advantage.

### *Allocative efficiency*

The best economic use of scarce resources – that use of resources which maximizes consumer utility. In the case of financial markets, this requires that funds go to their most productive use.

### *American option*

The option to buy or sell an asset at a pre-determined price at any time within the period of the option contract.

### *Asymmetric information*

The situation where one party in a bargain has information which is superior to that of the other.

### *Backwardation*

The state of a futures contract in which the price of the future is below the cash price of the underlying asset. The price of the future will be rising towards the cash price as the delivery date approaches.

### *Basis point*

One one-hundredth of a percentage point (i.e. 1% = 100 bp).

### *$\beta$ -coefficient*

An index which relates the amount of market risk in an asset to the risk in a whole market portfolio.

### *Call option*

An option which gives the buyer an opportunity to purchase an asset within the time specified in the contract.

### *Capital risk*

The risk that the capital value of an asset at the time of disposal may differ from the value expected.

### *Cash and carry strategy*

The process of arbitrage between the futures market and the cash market that establishes the boundaries within which the futures price must lie.

### *Clean price*

The price (usually of a bond) excluding any accrued interest.

### *Competitive laxity*

Competition for customers by financial centres in the form of relaxing the rules by which financial institutions must abide, resulting in the weakening of the regulation of the financial system.

*Compliance costs*

The costs of complying with regulation for those being regulated.

*Contango*

The state of a futures contract in which the price of the future is above the cash price of the underlying asset. The price of the future will be falling towards the cash price as the delivery date approaches.

*Correlation coefficient of return*

The extent to which the returns on two assets are correlated. The more closely the returns move together, the closer the correlation coefficient is to unity.

*Coupon*

The fixed, periodic, payment on a bond.

*Coupon rate*

The coupon payment on a bond, expressed as a percentage of its par value.

*Covariance*

A measure of the extent to which two (or more) asset prices vary together from their average values.

*Covered call*

A call option (q.v.) where the underlying asset is owned by the writer (seller) of the option.

*Covered interest arbitrage*

The act of moving funds from one country to another to gain from higher interest rates while protecting oneself in the forward foreign exchange market against spot exchange rate changes.

*Credibility*

The likelihood, as judged by market agents, of an announced economic policy or existing fixed exchange rate being maintained by the government.

*Currency substitution*

The use of or holding of a foreign currency by domestic residents, usually as a protection against expected depreciation of the domestic currency.

*Currency swap*

The exchange between two borrowers of the interest payments of different types of loans e.g. fixed and floating interest rate loans, loans in different currencies or loans using different basis rates.

*Default risk*

The probability that a borrower may fail to make payments of interest or repayment of principal at the scheduled time.

*Direct quotation*

The practice of quoting the exchange value of a currency by saying how many units of that currency is required to buy a single unit of another currency.

*Dirty price*

The price of a bond including any portion of the next coupon payment that may have accrued to the seller between the last coupon payment and the date of sale.

*Discount basis*

The rate of return on an asset quoted as a rate of discount on the principal *plus the interest payment*.

*Disintermediation*

The switching of lending/borrowing away from banks and other financial institutions to direct lending/borrowing or lending/borrowing via financial markets.

*Dividend yield*

The dividend payment on a share expressed as a percentage of the share's price.

*Divisia*

A measurement of the total stock of money which weights each component of the money stock according to its liquidity characteristics.

*Duration*

The average length of time taken to receive a series of income payments (usually from a bond).

*Efficient market hypothesis*

The proposition that prices of financial assets adjust instantaneously to all relevant news.

*European option*

The option to buy or sell an asset at a pre-determined price on a date specified in the contract.

*Exchange agio*

The sum payable for the convenience of exchanging one type of money for another, e.g. spot dollars for forward dollars – hence, in this case, the forward premium or discount on a currency.

*Extrapolative expectations*

The belief that the value of a variable, which has just changed, will go on changing in the same direction, e.g. that rising equity prices will go on rising.

*Fair game model*

A model of an efficient market in which all errors are random and hence there is no relationship between an investor's estimate of the deviation from the required or equilibrium rate of return and the actual deviation from that rate of return.

*Financial deficit*

The situation where planned consumption plus real investment spending exceed income.

*Financial surplus*

The situation where income exceeds planned consumption plus real investment.

*Fisher effect*

The assumption that in equilibrium real interest rates will be the same everywhere and hence that differences in nominal interest rates on different currencies will reflect only the differences in inflation rates in the respective countries.

*Forward premium/discount*

The difference between the spot and forward exchange rate.

*Functional integration*

The development of financial conglomerates, with mergers and takeovers leading to single firms being engaged in many financial functions, e.g. banking, insurance and securities business.

*Hoarding*

Saving. Usually associated with the idea of people holding money despite the loss of interest involved because of the fear of the prices of financial instruments falling.

*Income risk*

The probability that the rate of return from an asset will differ from what was expected.

*Indirect quotation*

The practice of quoting the exchange value of a currency by saying how many units of another currency can be bought with one unit.

*Inflation premium*

That part of the nominal interest rate which compensates for (strictly speaking expected) inflation.

*Informational efficiency*

The speed with which relevant information is incorporated into prices.

*Initial margin*

The percentage of the value of a futures contract that an investor must lodge with the clearing house at the beginning of a futures contract, against the possibility that the futures contract will experience losses.

*Interest rate parity*

Equality of interest rates in different countries, making allowances for expected changes in exchange rates (uncovered interest rate parity) or for the forward premium/discount of a currency (covered interest rate parity).

*Interest rate swap*

The exchange of interest rates on two loans – one a fixed interest rate loan, the other a floating interest rate loan.

*Interest yield*

The coupon payment on a bond divided by the market price of the bond.

*Intermediation*

Lending/borrowing carried out via a bank or other financial institution.

*Law of Large Numbers*

The Law of Large Numbers says that in repeated, independent, trials with the same probability  $p$  of success in each trial, the chance that the percentage of successes differs from the probability  $p$  by more than a fixed positive amount converges to zero as the number of trials becomes very large.

*Lender of last resort*

The sole supplier of bank reserves in the event of a system-wide shortage.

*Liability management*

Attempts by a financial institution to control the volume and type of its liabilities by varying the terms offered to holders of those liabilities.

*Liquidity*

The extent to which an asset can be converted to money, quickly, cheaply and for a known capital sum.

*Liquidity preference theory*

The theory that the rate of interest is determined by the demand for money (liquidity preference) and the supply of money.

*Liquidity premium*

The price people are prepared to pay (usually in the form of a lower return) for a liquid asset compared with an illiquid one.

*Loanable funds theory*

The theory that the rate of interest is determined by people's willingness to save and the demand for funds to invest in real capital assets.

*Marked to market*

The process by which margins are adjusted on the basis of daily price changes in the markets for assets underlying futures contracts. Investors must either pay additional margin to the clearing house or may draw funds from their margin accounts depending on the direction in which prices have moved in the cash markets.

*Market efficiency*

Usually refers to 'informational efficiency' (q.v.) but could refer to allocative (q.v.) or operational (q.v.) efficiency, or all three.

*Market risk*

The extent to which returns on assets vary because of events which affect the whole market portfolio of risky assets.

*Market segmentation*

The formal or informal division of markets into smaller segments influenced by different supply and demand conditions.

*Maturity transformation*

The difference between the average maturity of a financial institution's liabilities and its assets.

*Monetary base*

Notes and coin outside the central bank plus banks' deposits with the central bank.

*Money illusion*

Mistaking changes in nominal values for changes in real values; failing to allow for inflation.

*Money's own rate*

The rate of return on money. Usually calculated as the average rate of return on all deposits in the money stock, weighted by their respective proportion of the total money stock.

*Monitoring*

The process by which financial intermediaries attempt to ensure that loans are being used for the intended purpose and in an effective way and hence are likely to be repaid on time.

*Moral hazard*

The tendency of agents who are insured to behave more recklessly because of their insurance cover.

*NAIRU*

The 'non-accelerating inflation rate of unemployment'. (That rate of unemployment at which aggregate demand pressure is consistent with a constant rate of inflation.)

*Naked call*

A call option (q.v.) where the underlying asset is not owned by the writer (seller) of the option.

*Natural rate of unemployment*

The percentage of the labour force that is recorded as unemployed when the labour market is in equilibrium.

*Netting agreements*

The accounting practice of offsetting profits and losses on different contracts or in different currencies in the attempt to lower the overall level of risk.

*Operational efficiency*

The speed and cost at which a market enables transactions to be carried out.

*Payout ratio*

The fraction of a firm's earnings which it pays as a dividend to shareholders (= 1 - the retention ratio).

*Portfolio choice*

The decision to hold one's wealth in a variety of different assets.

*Portfolio equilibrium*

The situation where the distribution of wealth across a range of assets shows no tendency to change.

*Portfolio theory*

The principles involved in making the decision on how to hold one's wealth in a variety of different assets.

*Price/earnings (P/E) ratio*

The price of a company share divided by the earnings per share. A measure of the price that has to be paid for a share of a firm's profits.

*Purchasing power parity*

The situation where the exchange rate between two currencies represents the difference between the price levels in the two countries.

*Put option*

The option to sell an asset at a pre-determined price at some time in future.

*Random walk*

A time series in which the change from one period to the next in the value of the variable in question (e.g. an asset price) is purely random.

*Rate of discount*

The rate of return implied by the difference between the price paid for the asset and the amount the holder will receive when the asset matures.

*Rational expectations*

Expectations that would be formed by agents making the best use of available information.

*Real interest rate*

The nominal rate of interest *minus* the expected rate of inflation (strictly) but in practice often the nominal rate *minus* the actual rate of inflation.

*Redemption yield*

The rate of return on an asset (usually a bond) held to redemption, taking account of the reinvestment of coupon income and any difference in current price and redemption price.

*Reinvestment risk*

The risk that when a bond matures and the holder wishes to reinvest the proceeds interest rates will have fallen.

*Reputation*

The view taken by the market of the long-term policy performance of governments or central banks based on past performance and the constitutional constraints imposed on the authority in question.

*Retention ratio*

The fraction of its earnings retained by a firm for reinvestment in the business (= 1 – the payout ratio).

*Return*

The cashflow generated by an asset (usually expressed as a *rate*).

*Risk*

The probability that an outcome differs from what was expected.

*Risk premium*

The additional rate of return, over and above the return on a risk-free asset, required to persuade investors to hold a risky asset.

*Search costs*

The costs, in money and time, of finding an opportunity to trade.

*Securitization*

The transformation of a non-tradable asset/liability into one which can be bought and sold between third parties.

*Serial correlation*

A time series in which the change from one period to the next in the value of the variable in question (e.g. an asset price) is correlated with past values of the variable.

*Specific risk*

The variability in an asset's return caused by events specific to that particular asset.

*Strike price*

In an auction, the situation where all bidders pay the (same) minimum price necessary to clear the market. In an option, the price of the underlying asset at which it becomes profitable to exercise the option.

*Synthetic call option*

The combination of being long in the underlying cash market and, at the same time, holding a put option.

*Term premium*

The additional rate of return, over and above the rate on a short-dated asset, required to persuade investors to hold assets with a long period to maturity.

*Term structure*

The pattern of returns available on assets differentiated solely by their term to maturity.

*Time inconsistency*

The failure to maintain an announced policy because the original policy brings about changes in circumstances that then require policy authorities to alter the policy in order to maximize its welfare.

*Total risk*

The combination of specific risk, which relates to a particular type of asset, and market risk, which derives from events that effect all types of asset. Total risk is measured by the standard deviation of returns from the mean.

*Transaction costs*

Administrative costs of buying and selling in a market, including commissions and taxes.

*Variation margin*

The proportion of the value of a futures contract that must be held with the clearing house against the possibility of losses arising on the contract. Often the variation margin is the same proportion of the value as the initial margin.

*Velocity*

Total output at current market prices, divided by the stock of money in circulation.

*Yield basis*

The rate of return on an asset calculated, like a conventional rate of interest, on the basis of the sum laid out in order to earn the return.



### 2.3

(a) mis-estimation; (b) random fluctuation; (c) parameter change.

### 2.4

Flooding claims will be highly positively correlated. An overflowing river has the potential to inundate many properties simultaneously. Furthermore, this positive correlation may well not be simply a local matter. The path of a river can extend across a number of counties and bad weather after a long wet period can affect many parts of the country simultaneously, with the result that flood alerts can be outstanding in many localities at the same time. With total insurance payouts on flood-related claims as high as £5bn in the last five years, as indicated in the article, insurers truly face a catastrophe risk. Hence their threat to refuse cover unless the government continues to accept the cost of reducing substantially the risk that insurers face.

As is the case with flooding, losses are likely to be highly correlated at time of war and, on a smaller scale, when there are riots or civil commotion. All may be regarded as catastrophe risks, explaining the response of exclusion clauses.

### 2.5 (a)

The answer lies between these two extremes. It is clearly not a simple matter of transferring the individual's longevity risk onto the annuity provider since the latter will aim to use the LLN to reduce the longevity risk it faces itself. However, we know from our examination of insurers' residual risks (see Section 2.4.2), that the LLN cannot entirely eliminate the risks inherent in providing insurance cover. Similar considerations apply

here, notably that the annuity-providing intermediary is exposed to risks of mis-estimation and parameter change. Basing its calculations on mortality statistics (sample data), it will aim to ensure that the lump sum payments received from clients when they retire (taking into account the returns it can earn on them) will be sufficient to cover the pension payments made to clients of average longevity. However, since even sample averages of life spans will vary around their mean, the intermediary's calculations may turn out to have underestimated the true average longevity of its client group and, in any case, advances in medicine may cause average longevity to increase at a faster rate than it anticipates. Hence longevity risk does not simply disappear.

### 2.6

Changes (a) to (d) will all tend to make the scheme underfunded either now or in the future. An increase in the rate of benefit and an increase in the life expectancy will immediately increase the accrued liabilities of the scheme. A decrease in investment profitability will make it more difficult to cover liabilities already accrued, while a decrease in contribution rates will make it more difficult to cover liabilities that will accrue in the future so that, over time, the scheme will cease to be fully funded.

On the other hand, an increase in labour turnover (e) as well as a round of redundancies (f) will, *ceteris paribus*, tend to make the scheme overfunded. For, leaving the firm before retirement for whatever reason may in some schemes reduce the size of the pension that a worker may ultimately be paid on the basis of the contributions he or she has already made and hence reduce the liabilities of the scheme.

Finally, the impact of a rise in the inflation rate (g) could be either positive or negative. For it may increase the rate of return on the fund's investments. On the other hand, if pensions are index-linked it will increase the scheme's liabilities.

## 2.7

$$\text{Annual pension} = \frac{23}{80} \times \pounds 26,400 = \pounds 7,590$$

$$\text{Lump sum} = \frac{3}{80} \times 23 \times \pounds 26,400 = \pounds 22,770$$

## 2.9

- 1 (a) Both risks are borne by the employee; (b) Yes, the pension is or can be perfectly portable since the worker can transfer the value of the fund he or she has accrued at any point in time to a defined contribution scheme operated by another employer; (c) No, in addition to the risks referred to in (a), the value of the individual worker's fund is entirely dependent on what he or she has paid in.
- 2 This is a policy issue for the readers to weigh up for themselves. They should consider the advantages and disadvantages of defined benefit schemes discussed earlier, the advantages of defined contribution schemes and their disadvantages as indicated in Question 1.

## 9.1

- 1 3.8 per cent and 4 per cent
- 2 4.3 and 5 per cent
- 3 The difference in methods at low rates is 0.2 per cent, while at the higher rates the difference is 0.7 per cent

## 12.1

- 1 3500
- 2  $150 \div 3000 = .05$
- 3 10
- 4 10
- 5  $.040/.0547/.0547/.0495$
- 6 3530
- 7  $.0495/.0495/.0495$
- 8  $.0495$
- 9 1010/1010/1010
- 10 No change
- 11  $Dp = 3015$   $Cp = 515$
- 12  $135 \div 3015 = .0448$

## 12.2

- 1  $350 \div 3000 = .05$
- 2  $300 \div 3000 = .10$
- 3  $(.10 + 1.0) \div (.05 + .10) = 1.1 \div .15 = 7.33$
- 4  $1.1 \div .17 = 6.47$
- 5  $1.08 \div .17 = 6.35$

## 13.1

- 1 (a) Consumption rises as a proportion of income; higher money balances are required to meet the additional expenditure. The curve rotates left.  
(b) As wealth increases, consumption increases as a proportion of income and the curve rotates left.  
(c) As interest rates increase, there are two possible effects.  
(i) Expenditure possibly falls as a proportion of income, although this is not certain;  
(ii) the opportunity cost of holding money increases and people seek to economize on money balances. The curve is very likely to rotate right, reflecting the slope we have assumed in Figure 13.2
- 2 (a) The interest differential between money and other assets falls, lowering the opportunity cost of holding money. At any given interest rate on other assets, people will be more willing to hold money. The curve shifts to the right.  
(b) As income falls, the demand for money falls at all interest rates, the curve shifts to the left.  
(c) As wealth increases, the demand for money increases at all interest rates and the curve shifts right.  
(d) Increases in the costs of moving into and out of other financial assets reduce the opportunity cost of holding money and the curve shifts right.

## 14.1

- (a)  $2\% + 2\% = 4\%$
- (b)  $2\% + 4\% = 6\%$
- (c)  $2\% + 6\% = 8\%$

## 14.2

- 1 2%
- 2 4%
- 3 I would expect a *real* wage increase of 2%
- 4 I would expect no change in *real* wages.

## 14.3

- (a) 7.5%
- (b) 6%

## 15.1

- 1 12 per cent
- 2 12.12 per cent
- 3 £99,540

## 15.2

- 1 £205,000
- 2 £200,195
- 3 12.82 per cent

## 15.3

- 1 8.83 per cent
- 2 £6,013,150

## 17.2

- 1 Dividend yield =  $D_1/P = 34.5/690p = 5\%$   
Capital gain =  $g = 15\%$
- 2 (a)  $K = 6\% + 1.49(9\%) = 18.6\%$   
(b) Dividend yield =  $K - g = 18.6\% - 15\% = 3.6\%$

## 18.1

- 1 \$1 = €0.7866; €1 = \$1.2706 – 1.2721; €1 = \$1.2713  
\$1 = £0.5413; £1 = \$1.8464 – 1.8484; £1 = \$1.8474  
\$1 = ¥105.45; ¥100 = \$0.9452 – 0.9512; ¥100 = \$0.9482
- 2 (a) £1 = €1.4531; €1 = £0.6882  
(b) £1 = ¥194.8; ¥100 = £0.5133  
(c) €1 = ¥134.1; ¥100 = €0.7459

## 18.2

- (a) euro and pound;
- (b) (i) 1.05% p.a. premium  
(ii) 1.01% p.a. discount  
(iii) 3.1% p.a. discount

## 18.3

- (a) SFr1 = SKr5.8221
- (b) T\$1 = Won35.27
- (c) SFr1 = Bolivar2515.8

## 18.4

- (a) calculate the cross rate for yen against the euro through the dollar (€1 = ¥133.303); observe that the market is undervaluing the yen against the euro (€1 = ¥135.303); realize that to make a profit you will need to sell euro for yen (always sell the overvalued currency). Therefore, the steps required are: (i) sell € for ¥; (ii) sell ¥ for \$; (iii) sell \$ for €
- (b) 1.5 per cent

## 19.1

below

## 19.2

- (a) 1.17% p.a.      (b) 1.39% p.a.
- (c) 1.88% p.a.      (d) 1.72% p.a.
- (b) All forward/forward rates in this exercise are above the spot rates because interest rates were expected to rise over the following 12 months.

## 20.1

- (a) The money market interest rates for three months, six months and one year tell us that in March 2001, the market expected euro short-term interest rates to fall. They thus expected options premiums to rise and call options were attractive at strike prices that implied small falls in interest rates. It was thought extremely likely that interest rates would fall at least to 4.5 per cent by September and hence calls were much more popular than puts at the strike price of 9550. The difference between the premiums for call and put options narrowed at higher strike prices, reflecting the view that it was less likely that interest rates would fall to 4.375. Nonetheless, it was still thought probable. The market was almost balanced regarding the likelihood of interest rates falling as far as 4.25 per cent and hence the call and put prices at the strike price of 95750 were very similar. The fact that put options were more expensive than call options at the strike price of 95875 suggests that it was not thought very likely that interest rates would fall as low as 4.125 per cent.
- (b) April options had less than a month of life remaining and so there was much less chance that interest rates would fall sufficiently to make them profitable than was the case with September options. That is, the time value of April options was much lower.
- (c) Interest rates available to participants in the market must have been above 4.5 per cent because there were willing buyers of put options at the strike price of 95500 for all periods. If the interest rate had been below 4.5 per cent, options with a strike price of 95500 would have been in-the-money and arbitrageurs could have made a risk-free profit.

## 20.2

Those with strike prices of 4225, 4325, 4425 and 4525 since the strike price was below the FTSE index. This is clear from the options premiums on call options. As the strike price approaches the current value of the index, the index is less in-the-money and the premium falls. Notice that even call options that are out-of-the-money (FTSE index below the strike price) have a positive premium because of the time value of the option, although this is very small for May options because of the short time to expiry.

## 20.3

- B: 1. \$1.4241; 2. \$1.4241; 3. \$1.4284; 4. \$0.0043; 5. 0.43 cents; 6. 1.08 cents.  
 C: 1. \$1.4341; 2. \$1.4341; 3. \$1.4284; 4. -\$0.0057; 5. zero; 6. 0.72 cents.  
 D: The rule we have used for establishing the minimum price of a call option is for a European option. The Philadelphia Stock Exchange contract in Table 20.2 is an American option and thus the premiums will allow for the extra element in the time value, deriving from the possibility of American options being exercised before the expiry date. Thus, it is not surprising that B6 and C6 lie comfortably above the minimum price calculated as B5 and C5.

## 20.4

- (a) Acting in financial markets to protect oneself against the risk the value of a currency in which one is long falling in value or against the value of a currency in which one is short rising in value.  
 Allied Lyons were initially long in dollars and thought the dollar would fall in value. They might have hedged by:  
 (i) selling dollars forward;  
 (ii) selling futures contracts in dollars;  
 (iii) buying put options or writing call options in dollars.  
 (b) Acting as in (a) to a sufficient extent to reverse the existing long position e.g. selling **more** dollars forward than they expected to receive.  
 (c) A contract giving the right to buy dollars before or at expiry date of the option at the strike price specified in the contract.  
 (d) If the value of the dollar rises.  
 (e) Because the writer must pay the excess of the spot price of the dollar over the strike price, no matter how high the dollar rises. The writer of the option has to meet his or her obligation to provide dollars to the buyer.

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