The Japanese Foreign Exchange Market

Beate Reszat

Routledge Studies in the Growth Economies of Asia

THE JAPANESE FOREIGN EXCHANGE MARKET

In recent years, Japan's financial markets have seen dramatic changes. One of them is the explosive growth of currency trading and the increasing international role of the yen. Tokyo has become the third largest centre of foreign exchange trading worldwide, behind London and New York. *The Japanese Foreign Exchange Market* gives a comprehensive overview of this activity. It provides a comparative economic analysis of practices and risks as well as related policy issues.

After a short introduction to the history of money in Japan, the work focuses on three areas:

- General characteristics of the market such as market participants, trading strategies as well as accounting rules and practices and their influence on attitudes towards risks. In particular, the author searches for an explanation for the large currency losses Japanese firms experienced in recent years.
- The nature of foreign exchange risks, the sources of exchange rate variability, the dangers of derivatives trading and the threats lurking in Japan's large-value interbank payment systems.
- Policy issues, concentrating on prudential regulation and monetary policy cooperation and studying the prospect for a yen zone in Pacific Asia.

This work is the first non-Japanese-language title to examine the prolific rise of Japan's foreign currency market, its idiosyncracies and its future role in the global economy. It is vital reading for economists and students of Japan related subjects.

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LIST OF ABBREVIATIONS

ALM	Asset-and-Liabilities Management
ARCH	Autoregressive Conditional Heteroskedasticity
BADC	Business Accounting Deliberation Council
BCCI	Bank of Credit and Commerce International
BCCS	Bill and Check Clearing System
BDS	Brock-Dechert-Scheinkman
BIS	Bank for International Settlements
BoJ	Bank of Japan
BoTM	Bank of Tokyo-Mitsubishi
CHAPS	Clearing House Automated Payment System
CHIPS	Clearing House Interbank Payments System
CLSB	Continous Linked Settlement Bank
CME	Chicago Mercantile Exchange
DBL	Drexel Burnham Lambert
DEaR	Daily Earnings at Risk
DIC	Deposit Insurance Corporation
DPCs	Derivative Product Companies
EAF	Elektronische Abrechnung Frankfurt
EBS	Electronic Broking Service
Echo	Exchange Clearing House
EMS	European Monetary System
ERM	Exchange Rate Mechanism
ESS	Economic and Scientific Section of SCAP
Fedwire	Federal Reserve Wire Network
PEER	Fundamental Equilibrium Exchange Rate
FEF	Foreign Exchange Fund
FEFSA	Foreign Exchange Fund Special Account
FEFTCL	Foreign Exchange and Foreign Trade Control Law
FEYCS	Foreign Exchange Yen Clearing System
FILP	Fiscal Investment and Loan Program
FXA	Forward Exchange Agreement
GAAP	Generally Accepted Accounting Principles

GARCH	Generalised Autoregressive Conditional Heteroskedasticity
GMT	Greenwich Mean Time
IAS	International Accounting Standards
IASC	International Accounting Standards Committee
IBC	International Banking Corporation
IBJ	Industrial Bank of Japan
ICBAS	Investigation Committee on Business Accounting Systems
ICOM	International Currency Options Market Master Agreement
IFEMA	International Foreign Exchange Master Agreement
iid	independent identically distributed
IMF	International Monetary Fund
IMM	International Money Market
ISDA	International Swaps and Derivatives Association
JICPA	Japanese Institute of Certified Public Accountants
LME	London Metal Exchange
LTCB	Long-term Credit Bank
MITI	(Japanese) Ministry of International Trade and Industry
MoF	(Japanese) Ministry of Finance
OECD	Organisation for Economic Cooperation and Development
OTC	Over-the-counter
PHLX	Philadelphia Stock Exchange
PKO	Price keeping operation
PPP	Purchasing power parity
RTGS	Real-time gross settlement
SAGITTAIRE	Système Automatique de Gestion Intégré par Télétransmission de Transactions avec Imputation de Règlements Etrangers
SCAP	Supreme Commander of the Allied Powers
SDR	Special drawing right
SIMEX	Singapore International Monetary Exchange
SWIFT	Society of Worldwide Interbank Financial Communication
Target	Trans-European Automated Real-time Gross-settlement Express Transfer
TIFFE	Tokyo International Financial Futures Exchange
VAR	Value at risk

INTRODUCTION

The Japanese foreign exchange market is a strange thing. It is the second biggest market for foreign exchange worldwide, yet highly regulated; dominated by a few 'players', yet highly enigmatic; trading the largest amounts for single transactions, yet strangely antiquated; and restricted to few currency pairs and a small range of financial instruments. The participants in this market are mostly Japanese. Besides a handful of foreign banks in Tokyo it is dominated by Japan's big commercial or city banks, the long-term credit and trust banks, the big securities houses, insurance companies, trading companies and industrial groups. As this book went into print many of them were only able to participate indirectly.

The Japanese government has announced a full liberalisation of foreign exchange trading for 1998. Will this mean a fundamental change to what is described in the book? In a certain sense, yes. Sooner or later, there will be more direct players, a broader range of financial instruments and stronger market growth. In a certain sense, no. Most of those newly allowed free market access are already heavily engaged in currency trading. Additional reporting requirements and strengthened informal guidance by the authorities will keep the circle of new entrants small. Those who seek to trade widely unhindered by bureaucratic interference whatsoever will continue to turn to places such as London and New York, and increasingly to the emerging financial centres in Asia.

As past experience has demonstrated, in Japan many of the rules that are formally abandoned in the course of financial liberalisation in one way or the other make their way into informal habits of both regulators and regulated, with relations often becoming even more blurred and opaque than before. This book describes the foreign exchange market on the eve of deregulation. The reader is invited to follow the developments and judge the progress reached by market liberalisation in the years to come.

The first chapter gives a short overview of the history of money and financial markets and institutions in Japan. It traces the early beginnings of coin minting in the seventh century, its abandonment and the return to a barter system for the next several hundred years, the development of clan

money in later centuries and the first efforts to unite the country's monetary and financial system under the Tokugawa rule. It describes the fundamental reforms of the Meiji Restoration, the birth of the yen and the establishment of a banking system along Western models before turning in more detail to the post-war developments and the processes of deregulation as well as to the speculative excesses in the 1980s and 1990s.

The following chapters deal with some general characteristics of Japan's foreign exchange market. First, various groups of market participants are presented with a distinction made between those who, so far, are allowed to trade directly in the market, which are the authorised foreign exchange banks and brokers, and the broad range of customers who as a result of prevailing restrictions have a much greater weight in Tokyo than elsewhere. Second, market segments and transactions are looked at closely. Two results are worth mentioning. On the one hand, it turns out that in Japan derivatives trading has a much greater importance than in other financial centres. On the other hand, this trading concentrates on traditional over-the-counter instruments such as foreign exchange swaps, while new financial products such as futures and options play a minor role.

The high share of derivatives trading in Tokyo leads directly to the question of risk awareness and risk management in the Japanese market. The first part of the analysis deals with strategies to hedge against, and benefit from, currency risks. In particular, an explanation is sought for the large currency losses Japanese firms experienced in recent years. But, success and failure in foreign exchange trading depend not only on the strategies adopted but also on trading techniques used. Here, a general distinction is made between fundamentalists and chartists, and a special Japanese variant of the latter is presented. Another factor influencing attitudes towards risks is accounting. Japan is notorious for the opacity of its accounting practices and the analysis shows that in the past these practices were a main hindrance for market participants to develop a sound awareness of the risks involved in foreign exchange trading.

The next chapters look at the risks in detail. The analysis focuses on three aspects: on exchange rate variability as a source of market risks, the dangers of derivatives trading and the risks inherent in the transfer of cross-border payments, generally known as payment system risks. The first question is how can exchange rate variability be measured, then what explanations can be found for exchange rate changes and how can those changes be forecast. It will be argued that traditional measures of variability are not particularly reliable and that traditional theories of exchange rates are not much use in explaining and forecasting exchange rate changes. Accordingly, in recent years, analysts and market participants have developed new ways to cope with uncertainties and some of those approaches and the results with regard to the yen will be presented here. Since, in general, familiarity with these concepts is still low, they will be looked at in some detail.

Risk analysis has become particularly complex for derivatives instruments. Given the state of knowledge and facilities prevailing in Japanese financial institutions many of them do not seem well prepared to cope with the resulting challenges. In order to enhance understanding of the problems involved, for the computational requirements and the related costs of risk management, an example of a methodology for measuring market risks is presented. But risk measurement is only one facet of the problem. The best models do not help when faced with illiquidity and intransparency, two features the derivatives markets show particularly in times of crisis. An analysis of market linkages and operational risks will demonstrate what happens if the underlying assumptions of standard risk models break down.

The third complex issue is payment system risks. They arise from the fact that in foreign exchange trading the two legs of a transaction often take place in different time zones with hardly any overlap between the operating hours of the large-value interbank funds transfer systems of the countries with the most actively traded currencies worldwide. Japan's special exposure to these risks is twofold: on the one hand, Japan's payment systems handle by far the largest transaction volumes and, on the other, the lag before transactions are settled can be particularly long for yen/dollar trades. Recently, there have been several official as well as private sector initiatives to cope with those risks, developing solutions such as netting agreements. But, again, few Japanese banks so far have the facilities to participate in reciprocal arrangements.

The last chapters deal with policy issues. From a central bank's point of view there are two related aspects of foreign exchange trading which create a need for policy interference. One is the risk of financial instability and the resulting requirements of prudential control. The second is exchange rate variability calling for foreign exchange market interventions. Both make international policy cooperation indispensable or, at least, highly desirable. Without prudential control, there is a danger of a kind of 'regulatory arbitrage' where financial institutions from less regulated countries have a competitive advantage in other markets. In the second case a coordination of strategies may help increase the effectiveness of interventions. Due to their country's influence in international financial relations Japanese authorities should show a strong interest in both.

Part I
BACKGROUND

1

MARKET HISTORY

Compared to London, the world centre of foreign exchange, the Tokyo market is a rather new phenomenon. Both Britain and Japan are islands separated from their neighbours by the elements. But, while Britain has always been a seafaring nation, with strong trading relations with other countries, Japan's history shows a long period of isolation during the seventeenth and eighteenth centuries, and even before this there were comparatively few external links. Accordingly, there was not much demand for and supply of foreign exchange before the beginning of industrialisation which started with the Meiji Restoration in 1868.[1] Nevertheless, even before 1868 there was a relatively well-developed commercial economy with a long tradition of a financial industry[2] which, among other things, may help explain the country's rapid economic success later on.

EARLY BEGINNINGS OF MONEY IN JAPAN

Money and finance in Japan have a varied past.[3] Metal currency did not exist before the seventh century, the time of the first official diplomatic relations with China where metal coins were already in use. In the beginning, activities were limited by an insufficient supply of copper. Only when a large copper mine was found in Musashi province (now Saitama Prefecture) in the year 708 did mintage of Japanese coins modelled on Chinese ones begin. Those first coins were known as *wado kaichin* or *wado kaiho*. To increase their use and acceptance among the people various steps were taken by the government. For example, coins served as payments for government officials' salaries, and tax payments as well as purchases of paddy fields had to be made in coins (see Fujii, T. 1996a, b).

For the following 250 years 12 varieties of copper coins—each with a different name—as well as two of silver and one of gold were issued (see Table 1.1). But, these first monetary experiences failed. The cost of military campaigns and a move of the capital to Kyoto in 794 imposed an extraordinary strain on the economy leading to ongoing impoverishment of the people and financial bankruptcy of the government. In addition, copper for mintage became scarcer again. As a result, coins became 'smaller in size, coarser in quality and cheaper in purchasing power with each new recoinage' (Bank of Japan 1991a: 8). At

Table 1.1 Coin minting in early Japan

Coin	*Year of first minting*	*Weight*[a]
Wadō kaihō	708	3.0
Mannen tohō	757	4.0[b]
Shinko kaihō	765	6.0
Ryoei eihō	796	3.7
Fushou shinhō	818	3.4
Eiwa chohō	835	2.2
Chonen daihō	848	1.7
Gyoeki shinhō	859	2.1
Teikan eihō	870	2.6
Kanhei daihō	890	2.0
Enki tohō[c]	907	2.9
Kengan taihō[d]	958	1.9

a In grams,
b Some *mannen toho* weighed up to 6.0 grams,
c The Bank of Japan's name for this coin is *engi tsuho*. See Bank of Japan 1991a: 4.
d The Bank of Japan's name for this coin is *kengen taiho*. See Bank of Japan 1991a: 4.
Source: Peng (1994, Volume One: 292)

the same time, a lot of bogus coins emerged. What followed was a widespread loss of confidence in coined currency in general. In the end, the government was forced to stop minting coins, and after the twelfth coin, the *kengen taiho,* issued in 958, circulation of all coins became prohibited.

Nevertheless, economic development went on creating a growing need for a generally accepted medium of exchange. First, rice and fabrics were the only currency substitutes, although they were poorly standardised and highly unsatisfactory. Then, in the twelfth and thirteenth centuries the situation changed. Samurai groups and merchants, particularly in the western parts of Japan, increasingly engaged in trading with China and other countries which led to a large influx of continental coins. Smugglers and pirates extending their operations up to the Philippine Islands also contributed to this development. These foreign coins became widely used inside Japan and, for the next 500 years, remained the main pillars of the Japanese currency system.

In addition, during the fifteenth and sixteenth centuries, gold and silver started playing a growing role. The authority of the central government dwindled and feudal war lords and rival clans dominated the political scene. The war lords had gold and silver melted, shaping it into bars or plates. Most of these were weighed or cut at each transaction. One exception was the practice of the Takedas, a clan in Kai province (today Yamanashi Prefecture), who already used gold plates of fixed weight and value. The mid-sixteenth century also marked the establishment of contact with the West, and gold and silver were used to buy Western products, in particular guns.

Another fundamental change came with the beginning of the Edo or Tokugawa Period around 1600. Among the three successive rulers said to have united Japan—Oda Nobunaga, Toyotomi Hideyoshi[4] and Tokugawa Ieyasu—it was the latter who first fully realised the importance of a sound

monetary system for political stability and, at the same time, had the power to introduce such a system country-wide which would prevail for the next 270 years. Under the Tokugawa rule, mints for gold *(Kinza),* silver *(Ginza)* and copper and other base metal coins *(Zenizo)* were established—the Gold Mint was situated at the present site of the main office of today s Bank of Japan—and five varieties of gold and silver coins were issued.

Financial relations at that time became rather sophisticated. There were official exchange rates for converting one kind of coin into another and there were money exchange houses *(ryogae)*—merchants who, in addition to their other activities, offered various financial services.[5] They first concentrated solely on money exchange but later expanded their business activities to other functions like issuing bills, drawing drafts, receiving deposits and lending money. During the last decade of the Tokugawa Shogunate there were more than 1,300 *ryogae* in Osaka and about another 750 in Edo. Among the latter the most notable was the house of Mitsui which had offices in Osaka and Kyoto as well as agents all over the country, including Nagasaki (Tamaki 1995:5). When commodity prices were expressed in copper coins they were usually quoted in *mon*. In eastern Japan, when expressed in gold, they were quoted in *ryo, bu* or *shu,* and in western Japan, in weight of silver they were named *momme* or *fun*.[6] From 1661 onwards some feudal lords issued 'clan paper money' which was limited in circulation to their respective domain. Paper money was also issued by towns and villages, shrines, temples as well as commercial firms, but not by the shogunate government.[7] During the last years preceding the Meiji Restoration there were about 240 *han* issuing non-convertible currencies with an estimated 1,694 kinds of counterfeits existing (Yamamura 1967:199).

When Commodore Perry came to Japan in 1853, the country was forced to give up its long-time isolation *(sakoku)* that had started in 1639 and lasted for more than 200 years. During that time all external contacts were forbidden. Exempted from the ban were Chinese, Korean and Siamese traders who were allowed some limited activities at Nagasaki, the Ryukyu Islands and the isle of Tsushima. In addition, there was a small Dutch trading post on an artificial island, Deshima, off the coast of Nagasaki.[8]

The year 1854 marks the end of that period. In that year, in the wake of a so-called provisional treaty of amity, Japan and the United States signed a first agreement fixing their currencies at an exchange rate of one-fourth of one *ryo* for one US dollar. However, soon this rate turned out to be unfavourable for the United States, and, upon his arrival, Townsend Harris, the first US Consul-General to Japan, started negotiations for its revision. In 1858, under a treaty of commerce and navigation between the two countries, a new rate was fixed to three-fourths of one *ryo* for one dollar. Similar treaties with the United Kingdom, France, Russia and the Netherlands followed, and foreign currency became freely exportable.[9]

During the early years of opening up to the West, Japan experienced a severe financial crisis resulting from an imbalance between the internal and external value of precious metals. While the parity of gold and silver worldwide was about 1 to 15, it was between 1 to 5 and 1 to 10 in Japan. This caused a gold flight where Japanese gold coins were exchanged for foreign silver coins. The shogunate government reacted by recoining silver coins with the new pieces being of the same quality as the Mexican silver dollar which was then widely used in Asian trade. However, this and other measures were doomed to fail because the underlying reason for the gold flight, the discrepancy in gold-silver parities, remained.[10] Then in 1860 the government, following US advice, reduced the circulation of gold coins thereby bringing its gold-silver parity in line with that of other countries. But this came too late. Various feudal lords reacted by recklessly issuing clan bills and the situation became uncontrollable.

MEIJI RESTORATION AND THE BIRTH OF THE YEN

When in 1867 the Tokugawa rule came to an end its financial heritage looked disastrous: gold, silver and copper coins of different purity, weight and value competed with *daimyo* paper money and merchant-issued notes at fluctuating relative rates (Patrick 1967:252). At first, the Restoration government further added to the confusion by issuing inconvertible paper money to finance its expenditures.[11] This and the extraordinary means needed to fight the Satsuma rebellion in 1877 resulted in inflation, which made the need for establishing a sound and credible monetary system appear more and more urgent. In this situation, the government reacted by introducing a fundamental political and institutional change, the so-called Matsukata reform.[12] In 1882, in the course of this reform, the Bank of Japan was founded. The first measures of the new central bank were a step-by-step withdrawal of inconvertible paper money, accompanied by an austerity policy which gradually reduced the existing disparity between coins and notes.

In the early Meiji era issuing money was a permanent problem due to a lack of means and materials. For example, there were various kinds of paper money printed in foreign countries, like the notes issued in 1872 that were made in Germany, or others from 1873 manufactured in the United States. Due to the imbalance between coins and notes, the first Bank of Japan notes could not be introduced before 1885. They came in three denominations—of 100, 10 and 1 yen—and were convertible into silver. But the true birth of the yen was much earlier. It originated in 1870—again after a lack of facilities was overcome. The Bank of Japan describes the event as follows:

> As a matter of course, the government planned to reform the nation's outdated, complex monetary system as soon as possible, and to mint new and convenient currency that could command people's full

> confidence. Coincidentally, the British mint in Hongkong was put up for sale. The government promptly purchased all of that mint's equipment, set up a mint in Osaka and commenced the minting of coins, in foreign fashion, in 1870. It was then that the 'Yen' was actually born (the exchange rate being fixed at one US dollar for one yen), and they were issued after the New Coinage Act was made public in May 1871. These coins, whose prototype was carved by one Kano Natsuo, are still commended for their intricate design and elegance.
>
> (Bank of Japan 1991a: 19–20)

With the end of isolation from the West, the first tourists came into the country. A lively record of the monetary conditions they found is given by the following description. It comes from a Victorian British lady, Isabella Bird, who was travelling in Japan only ten years after the Meiji Restoration. Upon landing in Yokohama in May 1878, she wrote:

> Almost as soon as I arrived I was obliged to go in search of Mr. Fraser's office in the settlement…. No foreign money except the Mexican dollar passes in Japan, and Mr. Fraser's compradore soon metamorphosed my English gold into Japanese satsu or paper money, a bundle of yen nearly at par just now with the dollar, packets of 50, 20, and 10 sen notes, and some rouleaux of very neat copper coins…. The notes are pieces of stiff paper with Chinese characters at the corners, near which, with excep-tionally good eyes or a magnifying glass, one can discern an English word denoting the value. They are very neatly executed, and are ornamented with the chrysanthemum crest of the Mikado and the interlaced dragons of the Empire.
>
> (Bird 1984:10–11)

While the currency system still looked chaotic, facilities for what today would be called banking services were well advanced. Although following a rather traditional commercial orientation, considerable financial expertise had been built up under the Tokugawa rule.[13] Money changers and merchant financiers, as well as financiers of the *daimyo,* had developed a credit system comparable to those existing in Europe at that time. The main financial centre was Osaka. For a while an important exchange business existed between Edo (Tokyo), the administrative capital, and Osaka, because Osaka was on a silver standard while in Edo gold was the standard coin.

The silver standard helped ease the first balance-of-payments difficulties arising for Japan due to an overall expansionary government fiscal policy as well as inflationary tendencies. From the mid-1880s until 1897 Japan faced a *de facto* depreciating exchange rate when Western nations turned to the gold standard selling large quantities of silver, and the world price of silver relative to gold declined by almost a half. When in 1897 Japan went onto the gold

standard as well, this previous depreciation was silently accepted internationally with the official rate of the yen fixed accordingly. Until the suspension of the gold standard in 1917, the dollar/yen rate fluctuated within a narrow range around a parity of $49.845.[14] This rate helped contain the country's substantial current-account deficits which, until the outbreak of World War I, were otherwise financed by large inflows of foreign capital. Between 1904 and 1913 foreign investment equalled approximately one half of net domestic capital formation, excluding military expenditures (Patrick 1967:254).

With the success of the Matsukata reform, the introduction of a new currency and the issuance of convertible paper money as well as the adoption of the gold standard, Japan apparently had begun to 'catch up' with the West. Nevertheless, a Western traveller to the country around 1900 could still expect to find a confusing variety of coins and paper money as is documented in a well-known travellers' handbook of that time:

> The values are decimal, with the *yen,* equivalent to about two shillings English, or 50 cents U.S. gold, as the unit. One *yen* contains 100 *sen,* one *sen* contains 10 *rin*. The currency consists of gold, which is practically never seen; of silver pieces of 50 *sen,* 20 *sen,* 10 *sen,* and 5 *sen;* of nickel pieces of 5 *sen,* of copper pieces of 2 *sen,* 1 *sen,* and 5 *rin,* and of paper money worth 1 *yen,* 5 *yen,* 10 *yen,* and various larger sums.
>
> It is best to travel with paper money, both because of its superior portability, and because it is better known to the inhabitants of the interior than silver and gold. One of the first things the tourist should do is to learn the difference between the various notes for the values above-mentioned. He is advised to take with him no notes of higher denomination than 10 *yen,* as it is difficult to get change except in big towns.
>
> Except at Yokohama, Kobe, and Nagasaki, no foreign bank-notes or circular notes are negotiable.
>
> (Chamberlain and Mason 1907:4)

Western influence on monetary matters in Japan during the first years after the country's opening up was overwhelming. This applied not only to means of payment, minted and printed in 'foreign fashion', but also to financial institutions and structures in general. One example is the rapid growth of private banks and national banks which became the foundation of modern Japanese banking. Up to the banking law of 1890, that went into effect in 1893, quasi-banks, a financial heritage of the Tokugawa rule, played a decisive role in financial relations (see, for example, Patrick 1967:245–9). Operating mainly in rural areas and port cities they not only engaged in finance but also in trade and even production. Established by small to medium-sized merchants, farmers and money lenders they lent mainly to finance production and foreign trade. Most of the loans were short term and earned high interest rates. In the early years of the Meiji period, with growing industrialisation, the number of quasi-banks increased very rapidly (see also Table 1.2).

Table 1.2 Banks and quasi-banks in Japan, 1875–93

Year	*National Banks*		*Private Banks*		*Quasi-Banks*	
	Number	*Capital*[a]	*Number*	*Capital*[a]	*Number*	*Capital*[a]
1875	4	3,450	0	0	–[b]	–[b]
1880	151	43,041	39	6,280	120	1,211
1885	139	44,456	218	18,750	744	15,397
1890	134	48,645	217	18,978	702	14,512
1893	133	48,416	604	31,030	–	–

a In thousand yen.
b Unknown.
Source: Patrick (1967: Table VIII. 1)

But, under the new banking law, these quasi-banks were not recognised. Many of them became ordinary banks. The now established division of national banks and private banks reflected the government s efforts to build a financial system by adapting advanced Western institutions (Patrick 1967:249–51). But, the national banks did not survive either. Initially established as part of a modified version of the American national banking system, the banks had been given the right to issue national banknotes.[15] However, for Japan, that approach failed. Eventually, a model similar to the British one was chosen, where the central bank had a monopoly of note issue. By 1899, when the transformation of the system had come to an end, all national banks had either become ordinary banks or merged or closed, so that only one class of commercial banking institutions remained.

One main characteristic of the new Japanese system was its emphasis on strict separation and specialisation in banking services. There were commercial banks to finance trade and industrial production, savings banks to collect money from low-income depositors, and long-term credit banks to provide long-term finance for private and local government investment as well as other special banks for agriculture and later for the colonies.[16] As part of the new system there was also a bank specialising in transactions with foreign countries.

During the first years after Japan opened up to the West, external financial relations and the financing of foreign trade were wholly dominated by foreign banks. The first foreign bank in Japan was the British Hong Kong & Shanghai Bank. Its agents came to Yokohama in 1865, opening a branch one year later. Other activities followed in Kobe and Nagasaki, as well as in Tokyo in 1924. The second foreign bank, Chartered Bank, opened its Yokohama branch in 1880.[17] The Matsukata reform ended foreign dominance by establishing a special Japanese foreign exchange bank. The Yokohama Specie Bank opened in 1880—two years before the Bank of Japan. Although of private origin,[18] it became in effect a government bank. When in 1882 the central bank was established, the Ministry of Finance reached an agreement whereby the Bank

of Japan would not engage in foreign exchange business, emphasising yet again the principle of specialised institutions for special functions on an independent basis.[19] Moreover, the Bank of Japan had to provide cheap deposits to the Yokohama Specie Bank and rediscount its foreign exchange bills at preferentially low interest rates. This enabled the latter to subsidise export industries by granting them loans at the most favourable conditions.

Among other things, one task of the Yokohama Specie Bank was to keep fluctuations of the dollar/yen relation within a narrow range around the bilaterally agreed exchange rate, and, later under the gold standard, around its official parity. All business ventures abroad had to be cleared through the bank. For example, it advanced exporters the price of their goods at a discount as soon as they were loaded (see Born 1977:354–5). The exporter's advantage was that he was paid instantaneously and in Japanese bank notes. At the destination, one of the bank's agents then was responsible for collecting payment, receiving the respective amounts in foreign currency or *specie* (in silver and, since 1897 exclusively, in gold). These were used to pay back loans from the government or from the central bank. Any surpluses made were changed into Japanese notes which then served to finance new exporters' businesses. In this way, the Yokohama Specie Bank fulfilled two tasks: on the one hand, it promoted exports by pre-finance, on the other, it helped to concentrate foreign exchange holdings with the government and the central bank.

The year 1917 marked a preliminary end to the gold standard for Japan. Like many Western nations the country placed an embargo on gold exports during World War I. After 1918, following a wartime boom of its economy, the country suffered an extraordinary period of severe, long-lasting depression. On the one hand, this was caused by the end of the war and the resulting decline in foreign demand. On the other, it was aggravated and prolonged by two events, the great Kanto earthquake in 1923[20] and the financial panic in 1927.[21]

To cope with the growing instability—and following the example of other countries—in 1930 the government decided to return to the gold standard and lifted the export embargo restoring the parity of the yen at its old level. However, the result was a large outflow of gold which became worse when, in September 1931, Britain suspended the gold standard. Again, Japan was forced to ban gold exports, and, eventually, in December 1931, it put an end to the gold standard once and for all.[22]

For the following years, first, a more or less free float was adopted. Then, in 1933 the yen became pegged to sterling (see Lothian 1991:271, Einzig 1971:262). This situation continued until the outbreak of World War II, when the Japanese government decided to peg the yen to the dollar. After the Pacific war began in 1941, this peg was abandoned as well and a Yen Area of countries under Japanese occupation was envisaged. For this purpose, the Japanese issued military notes *(gunpyo)*. These were not denominated in yen but, with regard to greater acceptance among the population, in the national currencies of the conquered countries. There were Japanese pesos in the Philippines, Japanese guilders in the Dutch East Indies, Japanese rupees

in Burma and so forth.[23] There were plans for Japan to adopt a new currency unit for trade with those countries, and for the Bank of Japan to become the Area's central bank. But the end of the war put an end to those plans, too.

Seen as a whole, the 1930s and 1940s were characterised by growing regulation which, among other things, used foreign exchange as a means of financial control (see also Calder 1993:33–5). Exchange controls were first established under the Capital Flight Prevention Law, enacted in 1932 to contain capital flight and currency speculation following the suspension of the gold standard and the Manchuria incident in 1931. During World War II, there was a reorganisation of the central bank. In 1942 the reformed Bank of Japan Law was introduced which followed widely the German Reichsbankgesetz of 1939 in strongly emphasising national goals and formalising the Bank's increased powers to control the credit-allocation process.[24] It is still valid today. Both laws in a sense marked the beginning of a new era of government involvement, reflecting an attitude that prevailed for more than four decades and, even today, seems to be influencing official decisions now and then.

POST-WAR DEVELOPMENTS

From 1945 through 1952, Japan was under Allied Occupation and authority over the financial system was ceded to the Supreme Commander of the Allied Powers (SCAP). During the first years of its rule, the country was hermetically sealed; for example, foreign businessmen were not even allowed in until July 1947.[25] There was a special Economic and Scientific Section (ESS) of the SCAP responsible for all banking activities. Overseas and special banks with wartime functions had to be closed. This concerned, among others, the Yokohama Specie Bank. Occupation officials controlled all foreign exchange transactions. Japanese, including banks and companies, generally were not allowed to hold foreign currency. Although there was a limited amount of state trade through the International Trade Agency, until 1949, there was no official exchange rate for the yen (Tateno 1993:453). Foreign-currency funds had to be deposited exclusively with foreign banks. This enabled the SCAP 'to exercise control without any involvement from the Japanese government, yet to do so consonant with Japanese law' (Brown 1994:21). The SCAP issued military dollar notes and, in the beginning, fixed the exchange rate at 15 yen per dollar. With economic conditions worsening it raised the rate subsequently, reaching a maximum of 800 yen per dollar in 1948 (Einzig 1971:262). Then, in the following year, the military-currency system was abandoned and the exchange rate for commercial transactions was fixed at 360 yen per dollar.

Slowly, banking relations and functions were re-established. From June 1948 on, foreign banks were allowed to act as agents for foreign nationals with respect to assets owned before the war, make yen loans to licensed business organisations, invest yen deposits in short-term government obligations

and engage to a certain extent in foreign exchange transactions (Brown 1994:22). Successively, foreign banks also began to provide credits for trade finance and, sometimes, they even financed specific projects. Nevertheless, considerable restrictions on their activities remained and they were not allowed to compete directly with Japanese banks.

Japanese institutions, too, faced severe limitations. The overall impression of Japan's financial markets at the end of World War II was that their main structural characteristics 'were that of a "hollow", underdeveloped market place with indirect finance (that is, bank intermediation) the dominant force' (Hall 1993b: 88). It was a system of tight regulation and protection from all kinds of unwanted influences which prevailed up to the early 1970s.[26] Its main characteristics where rigidly segmented financial institutions, poorly developed securities markets, interest rate controls and a dominance of public sector financial institutions.

One cornerstone of the system was extensive foreign exchange and capital controls isolating the Japanese economy from the rest of the world. In 1949, the Capital Flight Prevention Law was succeeded 'almost verbatim' (Calder 1993:33) by the Foreign Exchange and Foreign Trade Control Law (FEFTCL).[27] At the same time, the authority to manage foreign currencies and control foreign exchange transactions was transferred from the SCAP to the Japanese government—first to an independent foreign exchange control board and in August 1952 to the Budget Section of the International Trade Bureau of the Ministry of International Trade and Industry (MITI) which held this function until 1964. During those years, responsibility was divided: the MITI exercised control of foreign exchange allocation as one of the most powerful tools of its industrial policy, while the Ministry of Finance (MoF) administered exchange controls under financial aspects helping to isolate Japanese interest rates from the rest of the world (see Calder 1993:34–5).

The main feature of the FEFTCL was its exclusionary character: all financial transactions with other countries were forbidden unless explicitly authorised. The reason for this rule was simple. In the post-war years, two problems appeared of the utmost gravity for the Japanese economy: the high inflation which endangered the stability of the currency, and the scarcity of foreign exchange which imposed a permanent threat to the country's reconstruction and industrialisation.[28]

Under the law, foreign exchange could only be held by the government in its Foreign Exchange Fund Special Account,[29] with the Bank of Japan as well as with authorised foreign exchange banks *(gaikoku kawase konin ginko)*. Corporations and individuals were obliged to sell foreign exchange to the government within one month of acquiring it (Calder 1993:34). Thus, in the first years, banks only acted as agents of the government collecting foreign exchange from the public. Then, in 1950, private enterprises began to replace the public sector in conducting international transactions. In 1952, the Ministry of Finance allowed foreign exchange banks to hold a limited amount of

dollars—and later on of other currencies, too[30]—on their own accounts and the banks became buyers and sellers in the newly established Tokyo foreign exchange market. In the same year, Japan also became a member of the International Monetary Fund (IMF) with the official parity registered to be 2.46853 milligrammes of fine gold per yen, equal to 360 yen per dollar and a fluctuation margin of 0.5 per cent on either side of the parity (Einzig 1971:263).

Now, a foreign exchange market existed, but progress was slow. There was a transitional arrangement with the IMF according to Article 14 of the Fund's Articles of Agreement which allowed Japan to maintain exchange restrictions on current transactions until 1964. In 1963, leading Western countries widened the fluctuation margin around the IMF parity of their currencies to 0.75 per cent on either side and the Japanese government decided to do the same (Tateno 1993:456). At the same time, it began officially to intervene in the market to keep the exchange rate within those margins while Japanese banks started to trade more actively on their own accounts.

In 1960, the Japanese government introduced a Foreign Trade and Foreign Exchange Liberalisation Plan, but due to several reasons market volume remained low.[31] On the one hand, trade-related international transactions were often carried out overseas or kept internal to the large Japanese trading companies *(sogo shosha)*. On the other hand, portfolio capital flows were small. There were strong controls of capital exports as well as of capital imports. For example, although the first bond issues by Japanese corporations abroad took place as early as 1961 (by Sumitomo Metals and Kawasaki Steel), up to the beginning of the 1970s the euromarkets accounted for no more than 1.7 per cent of Japanese corporate financing (Calder 1993:217).

Non-resident activities in the Japanese capital market were even more modest. When samurai bonds, yen-denominated bonds issued in Japan by non-residents, first appeared in the 1970s, the market was only open to foreign governments, government agencies and international organisations.[32] It was only in the early 1980s that it was opened to foreign corporations and other non-governmental institutions with a single-A rating, and since August 1992 to foreign government-affiliated bodies with a BB+or BBB rating. Shogun bonds, foreign-currency denominated bonds issued by non-residents in Japan, date from 1972, and non-resident eurobonds issued in Japan and sold to investors in the euromarkets (daimyo bonds) even from 1977.

At times, there were sporadic approaches to liberalisation. For example, in 1966 trading companies were allowed to hold foreign currency and non-residents could open yen-denominated bank accounts in Japan. From 1970 on manufacturers could directly engage in foreign trade. But it was not until the end of 1978 that any individual in Japan could freely hold foreign currency or establish a dollar account with a Japanese bank. And even then, the principle remained requiring designation by the Ministry of Finance as a prerequisite for legally holding foreign exchange (see Calder 1993:34).

MARKET LIBERALISATION

The system of controls and regulations worked well until the early 1970s. Then pressures for change became overwhelming. The pressures came mainly from two sources, an international and a domestic one.[33] On the domestic side structural shifts in the economy brought a fundamental change in saving/investment relations among sectors. The corporate sector's need for borrowing sank while, at the same time, the government deficit rose leading to a huge increase in government bonds that fostered the development of the securities markets. Internationally, since the mid-1960s, Japan had become a capital exporter due to a growing current-account surplus. First, the authorities reacted by increasing their foreign exchange reserves allowing an overexpansionary monetary policy. But, in the long run that strategy became untenable. With the currency turbulences at the beginning of the 1970s, and the experiences after the transition to worldwide floating in March 1973, it soon became clear that maintaining restrictions on private capital outflows would only increase the pressure on the exchange rate.

There were two broad strands of reform, first a revision of the legislative framework controlling foreign exchange transactions and second, the internationalisation of the yen by liberalising euroyen transactions and creating a Japanese offshore market (see, for example, Düser 1990:53–7). The Foreign Exchange and Foreign Trade Control Law was substantially revised in 1980. The fundamental change was that foreign exchange transactions now became principally 'free' only requiring prior notification instead of prior approval by the Ministry of Finance. The second step was the abolition of the so-called Real-Demand Rule in 1984 which demanded foreign exchange trades to be based on real commercial transactions. That had excluded companies from all kind of forward transactions for hedging as well as speculative purposes. As the growth of trading volume in subsequent years shows (Table 1.3) this, rather than the reform of 1980, proved decisive for the development of the market. Other important changes came in 1985, when banks became allowed direct dealing and international broking, and in 1986, when the Reuters' Dealing System was introduced and Tokyo dealers for the first time were allowed to trade with an overseas counterparty on a real-time basis.[34]

The euroyen liberalisation started in 1977 with the admission of euroyen bonds issued by non-residents. However, during the first years, only a few institutions were eligible issuers.[35] The markets flourished from 1985 onwards when the range of issuers was expanded and guidelines for the criteria they had to meet were modified. Euroyen instruments are yen-denominated financial assets that are traded outside Japan. London is the biggest market for those instruments. Others are Singapore, Hong Kong and New York. There are not only euroyen bonds but also euroyen deposits, euroyen CDs, euroyen CP as well as euroyen loans. The trade was and is dominated by Japanese banks. Euroyen transactions have competitive advantages *vis-à-vis* the domestic markets in that they 'have always been free from domestic controls in the

Table 1.3 Trading volume in the Tokyo foreign exchange market[a]

Year	*Spot*	*Forward*	*Swap*	*Total*
1960	0.3	0.3	0.0	0.6
1965	2.1	1.7	0.8	4.6
1970	4.8	4.2	2.5	11.5
1975	22.9	26.0	24.5	73.4
1980	211.8	66.8	300.6	579.2
1985	462.7	4.4	968.5	1435.6
1990	2495.7	–[b]	3466.9	5962.5

a In billions of US dollars,
b From February 1985 onwards forward transactions are included in swaps.
Source: Tateno (1993: Table 14.1)

shape of interest rate controls and legal reserve requirements and from the practices that prevail in domestic markets, such as collateral requirements' (Hall 1993b: 104).

The Tokyo Offshore Market was established in December 1986. In contrast to the euroyen market it is not open to Japanese residents. There are authorised foreign exchange banks—which have to keep separate accounts for their domestic and their offshore operations (Düser 1990:57)—that mediate between nonresidents. There is no securities trading. This is one reason why volume in the market is low compared to other centres worldwide. Other reasons are corporate and local taxes and the stamp duty (see Hall 1993b: 107–8).

The main driving force behind the internationalisation of Japans financial markets was the Yen/Dollar Committee, a US/Japanese group established in November 1993 when US President Reagan visited Japan.[36] It was headed by the Japanese Vice Minister of Finance, at that time Oba Tomomitsu, and the US Under Secretary of the Treasury, Beryl W.Sprinkel. The committee met six times between February and May 1984 and presented a report suggesting major steps towards financial deregulation. The United States had been worried by the persistent trade imbalances between the two countries. With the Yen/Dollar Agreement they hoped for a reversion of capital flows putting the yen under pressure thereby reducing Japans current-account surplus. The Japanese side agreed in principle to a relaxation of controls despite considerable official fears of possible destabilising effects on the financial system.

At the same time as Japan opened its system to the world, Japanese banks increased their international activities. In the 1960s and early 1970s they had played only a minor role worldwide. They had been mostly following their customers' trade. In addition, as long as Japan ran a current-account deficit, international lending by Japanese banks was severely restricted (Düser 1990:98). In the 1970s the banks' international business expanded with one strong motive being the circumvention of official regulation in the domestic markets.

The 1980s then were characterised by Japanese enterprises in search of investment opportunities for their growing capital surpluses with Japanese banks providing the respective facilities worldwide. With the revision of the FEFTCL and the announcement by the Ministry of Finance that international banking should become one of Japan's future dominant industries the banks' role worldwide grew even stronger.

Arbitrage between the Japanese and international markets was greatly facilitated after the regulation of yen conversion *(en tenkan kisei)* in Japan was abolished in June 1984.[37] Under that rule, limits had been imposed on the banks' open short positions in foreign currency in the spot market. The intent was 'to restrict the amount of yen that could be obtained by selling foreign currencies borrowed in markets abroad' (Takeda, Turner 1992:18) and to prevent sudden inflows of capital exerting a destabilising influence on the exchange rate. The relaxation of the rule allowed banks to borrow from, and lend to, each other with unregulated interest rates by using foreign currency deposits which were swapped into yen. In this way they could circumvent regulation of interbank deposit rates in the domestic market. However, even after the liberalisation, the Bank of Japan, fearing a weakening of monetary control by an increase of direct transactions between banks, was reported to maintain some informal grip by simply asking the big institutions to refrain from that kind of transaction.[38]

Despite those influences, the ending of the formal limits to yen conversion strongly contributed to the importance of Tokyo as a foreign exchange market. Another stimulus was allowing direct dealing between banks—without the intermediation of a foreign exchange broker—which was put into effect in two steps. It started in June 1984 with yen/dollar transactions remaining exempt until February 1985 (Hall 1993b: 110). The results of these developments were truly remarkable. For example, at the end of May 1984, the outstanding balance of yen swaps was ¥250 billion. Two months later, at the end of July 1984, it amounted to more than ¥1 trillion. By the end of March 1986 it had reached more than ¥2.5 trillion (Viner 1988:201).

In the second half of the 1980s Japanese financial markets experienced dramatic changes. Stock and land prices boomed triggering a speculative bubble that seized the whole economy. In December 1989, at the height of the bubble, the Japanese stock market made up 42 per cent of the total capitalisation of world stock markets. In 1990, Japan's total property had an estimated value of ¥2,000 trillion, that was more than five times the size of the country's GNP and about four times the value of total property in the United States.[39] The growth of the foreign exchange market, in a sense, reflected the overall development. In April 1989, the Japanese market had become the third largest worldwide with an estimated average daily foreign exchange turnover in Tokyo of about $145 billion.

More than a few observers regarded international developments at least partly responsible for the folly. It all began in September 1985 with the remarkable success of the so-called Plaza Accord, an international agreement of the seven

biggest industrial countries (G7) to bring down the value of the dollar by joint efforts consisting of a mixture of combined interventions in the foreign exchange markets and announced monetary and fiscal policy measures.[40] When, after a while, the subsequent fall of the dollar began to appear worrying as well, and, in particular, put pressure on US–Japanese trade relations, this success was to be repeated under reverse signs. In February 1987, another agreement was reached, this time to halt the dollar's decline. The Louvre Accord demanded, among other things, a loosening of monetary policy from Germany and Japan.

At that time, with the Japanese economy in recession, the Bank of Japan was only too willing to bow to international pressure. Interest rates had already begun to come down earlier: between January 1986 and February 1987 the official discount rate in Japan declined from 5 to 2.5 per cent. The loose monetary policy created a most favourable environment of cheap credit fuelling a speculative demand for all kinds of assets, from shares over property to art objects and golf club memberships.[41] Shares and property at inflated prices in turn widely served as collateral for new bank credit creating ever more waves of speculative demand. These developments were reflected in the balance of payments as well. During those years, Japan's net long-term capital exports by far exceeded the country's current account surplus as the demand for foreign assets financed by cheap domestic credit swelled. The long-observed relationship between trade and foreign investment simply broke down.[42]

IN THE AFTERMATH OF THE BUBBLE

In 1990, the bubble burst. In a decided attempt to halt the speculation the Bank of Japan finally turned to a restrictive monetary policy. As a result, the Nikkei index which stood at ¥6,870 in 1980 and at ¥12,556 in 1985, which survived the worldwide crash of stockmarkets in October 1987, and at its peak on 19 December 1989 reached ¥38,915, fell within a few months by 48 per cent to ¥20,221 in October 1990 (Nakao 1995:99–100). Property prices weakened too, but, at first, only moderately. Domestic demand did not slow down significantly before 1991.[43] The true damage the bubble had done would only become visible in the years to come.

In the long run, the decline in land and asset prices profoundly undermined both corporate and consumer confidence. The result was, among other things, a particularly long-lasting downswing in the business cycle which badly affected the financial system struggling to survive.[44] After the breakdown of the bubble, banks suddenly faced a massive overhang of bad debt which made them most reluctant to lend new money.[45] In addition, for a long time activities in Japan's securities markets remained low and a serious debate ensued of whether the financial system experienced a fundamental 'hollowing out'—a debate which is still going on.

Fears in this respect are grounded on various observations.[46] First, there is a steady increase in offshore trading of Japanese stocks while, at the same

time, the Tokyo Offshore Market shows a considerable lasting weakness. Second, a growing number of foreign companies are delisting from the Tokyo Stock Exchange. Third, more and more Asian companies are bypassing Tokyo in favour of listing in New York and other overseas markets. Fourth, trading in new financial instruments has slowed down in recent years. Fifth, foreign banks and securities houses are increasingly shifting their activities from Japan to Hong Kong and Singapore. And finally, the growth of the foreign exchange market in Tokyo has slowed down as well, which will be discussed in more detail later.

However, while for some observers these developments are a matter of great concern[47] others consider them highly overrated.[48] Nevertheless, there seems widespread agreement on a number of fundamental weaknesses which so far pose severe impediments for Tokyo to recover and to strengthen its position as an international financial centre. Among those most often mentioned are a lack of qualification and market sophistication and the ability to attract big non Japan-related business (see Kawai 1995). Further, there are complaints of a poor infrastructure, high fees and taxes, excessive regulations and controls, and practices that violate market principles as well as a lack of discretion and few innovative products.

Many of these points hold for the Japanese foreign exchange market, too, as a closer look will show. This market's fate is perhaps even more deeply inter-woven with that of the financial system of its home country than that of other big foreign exchange centres. The reason is the dominating regional nature of the Japanese market. This will become clear from a comparative analysis of its main actors.

Part II

GENERAL CHARACTERISTICS

2

MARKET PARTICIPANTS

Nowadays international capital is highly mobile and after the latest rounds of deregulation in major industrial countries during the 1980s few restrictions on financial flows worldwide are left. There is a strong interdependence between markets in various regions, which holds particularly true for widely homogeneous financial products like short-term debt instruments or foreign exchange. Nevertheless differences remain, depending on among other things market participants, the products traded, the legal environment as well as private and official attitudes towards risks. In what follows, some of these characteristics for the Japanese foreign exchange market will be analysed in detail.

Although today the foreign exchange market is a 24 hours global market, trading varies considerably during the day and across regions and is becoming mostly inactive on weekends and national holidays. The week starts on Sunday at 22:30 Greenwich Mean Time (GMT) with the opening of the Asian markets and ends on Friday at about 22:30 at the West Coast of the United States. Around the world, there are an estimated 500,000 foreign exchange dealers who in turbulent times handle a daily turnover of up to $2,000 billion.[1] Market participants are on the one hand the world's largest banks and securities houses and on the other hand big institutions like non-financial corporations and institutional investors.

The Japanese market is a telephone interbank market with almost all transactions concentrated in Tokyo.[2] There is a small market in Osaka, too, but its share is only about one per cent of total turnover (Kuroda 1995:223). Until February 1995, trading hours were restricted from 9:00 to 12:00 in the morning and again from 13:30 to 15:30. But, during the last years those restrictions were treated rather loosely and now are totally abolished.[3]

Generally, trading rules and practices in Tokyo are determined in self regulation by a special organisation, the Tokyo Foreign Exchange Market Practice Committee (Tokyo Gaikoku Kawase Shijo Kanko Iinkai). Founded in October 1971 this group consists of the Bank of Tokyo-Mitsubishi as a permanent member—and its principal organiser—as well as 14 authorised foreign exchange banks (including four foreign banks), 2 foreign exchange brokers and the

Association of Foreign Exchange Brokers. The Bank of Japan has the status of an observer. The committee was established to safeguard the interests of market participants and, at the same time, ensure orderly market conditions.[4]

Who are the main actors in this market? When some years ago the Japanese government made a desperate move to halt a currency speculation under their sphere of influence, the Ministry of Finance (MoF) and the Ministry of International Trade and Industry (MITI) were reported to have turned directly to the people who they thought were the most influential 'players' in this field, bluntly asking them to refrain from further destabilising activities. The men they summoned were from

- Japan's big commercial or city banks
- 3 long-term credit banks
- 7 trust banks
- 16 foreign banks
- the Central Cooperative for Agriculture and Forestry (Norinchukin)
- the 4 biggest securities houses
- the 4 largest fund-management companies
- 5 big life insurance companies
- 4 non-life insurance companies
- 9 trading houses as well as
- 45 big industrial groups (*The Economist* 1987c)

Obviously, those men, and the firms they represented, were assumed to have enough influence to move the exchange rate and—jointly or single-handedly—to undermine any government's efforts to stabilise the yen. Thus, to understand the functioning of the market, and the activities that drive the exchange rate, it may be worthwhile to have a closer look at those various groups.

FOREIGN EXCHANGE BANKS AND BROKERS

With respect to market participants, one remarkable characteristic of the Tokyo market is its comparably large share of interbank transactions (Table 2.1). They account for 73 per cent of total market turnover, compared to New York with 57 per cent. They are comparable to London where interbank transactions have a share of 75 per cent, although for different reasons. While for London this number demonstrates the importance of the City as a centre of international finance—as is also indicated by its relatively low share of local versus crossborder trading—for Tokyo it rather reflects the institutional restraints prevailing there.

In the Japanese foreign exchange market direct market participants are the authorised foreign exchange banks, foreign exchange brokers, and, acting on behalf of the Ministry of Finance, the Bank of Japan. All other banks, non-bank financial institutions as well as trading and manufacturing companies cannot participate in the market by themselves.

Table 2.1 Customer and interbank transactions in international comparison[a]

	Tokyo	*London*	*New York*
Interbank transactions	118.5	349.0	138.4
• Local	35.0	107.5	50.5
• Cross-border[b]	83.5	241.4	87.8
	(70)	(69)	(63)
Customer transactions	42.8	114.8	106.0
• Local	38.3	63.2	53.8
• Cross-border[b]	4.6	51.5	52.3
	(11)	(45)	(49)
Customer-trading ratio[c]	27	25	43

a As of April 1995, in billions of US dollars,
b Figures in parentheses are the percentage share of cross-border transactions in total interbank transactions,
c Percentage share of customer transactions in total trades.
Source: Bank of Japan (1996a: Table 6).

In October 1993, there were 344 authorised foreign exchange banks representing 32 per cent of all banks in Japan (see Table 2.2), and 239 of them served as correspondents to other banks worldwide, although 23 institutions were officially restricted in this function. There is one specialised foreign exchange bank, the Bank of Tokyo-Mitsubishi (BoTM), formerly Bank of Tokyo. In addition, all city banks, long-term credit banks and trust banks as well as all foreign banks and (with one exception) all regional banks are authorised foreign exchange banks. Further, 91 out of 435 credit associations are permitted foreign exchange dealings as well as one credit cooperative and the Central Cooperatives for Agriculture and Forestry (Norinchukin) and for Commerce and Industry (Shokochukin), and the Export-Import Bank of Japan (Nihon Yushutsunyu Ginko or Yugin).

Not all institutions are equally active in the foreign exchange market. The city banks, the long-term credit banks and the trust banks are said to hold a particularly large share due to their large size and their wide range of customers (see Tateno 1993:464). Remarkable differences can also be found in the international presence and range of activities of the banks worldwide (Table 2.3). While, for example, the Bank of Tokyo-Mitsubishi, the city banks and all long-term credit banks have overseas representative offices as well as their own foreign branches and large stakes in overseas firms, only six trust banks, few regional banks and one credit association show this kind of presence.

The differences in the range of activities once again reflect the strict principles of separation and specialisation in financial services prevailing in Japan since the beginnings of modern banking. Up to its merger with Mitsubishi Bank in April 1996, the Bank of Tokyo, the successor of the Yokohama Specie Bank, was still the Japanese foreign exchange bank although its general reputation somewhat suffered in recent years. Private by nature the bank, and its successor, has—and always had—unusually close connections to the Japanese government;

Table 2.2 Authorised foreign exchange banks[a]

Institutions	*Total number of banks*	*Authorised foreign exchange banks*[e]	*Correspondents*		
			Restricted	*Unrestricted*	*Total*
Specialised foreign exchange banks	1	1 (32)	–	1	1
City banks	10	10 (1,617)	–	10	10
Long-term credit banks	3	3 (56)	–	3	3
Trust banks	21	21 (145)	5	16	21
among which foreign banks	9	9 (9)	–	9	9
Regional banks	64	64 (1,141)	3	56	59
Regional banks II[b]	65	60 (377)	12	29	41
Credit associations[c]	435	91 (199)	3	9	12
Credit cooperatives	385	1 (1)	–	–	–
Nōchū/Shōchū/Yugin[d]	3	3 (53)	–	2	2
Foreign banks	90	90 (145)	–	90	90
Total	1,077	344 (3,766)	23	216	239

a As of October 1993.
b The former mutual savings banks or *sogo ginko* now integrated in the Second Association of Regional Banks (Dai-ni chiho kyokai). See, for example, Shima 1991:92–93, Wohlmannstetter 1991:46–49.
c So-called Shinkin banks or *shin'yo kinko*.
d Norinchukin (Central Cooperative Bank for Agriculture and Forestry), Shokochukin (Central Cooperative Bank for Commerce and Industry) and Yugin (Export-Import Bank of Japan),
e In parentheses the number of foreign exchange branch offices.
Source: Ikawa (1994:95)

a large percentage of the country's foreign exchange reserves are deposited there and often the Bank of Japan intervenes in the foreign exchange market through what is now the Bank of Tokyo-Mitsubishi (see also Viner 1988:162–4). With its wide international network—in early 1996 the Bank of Tokyo alone spoke of approximately 400 offices around the world[5]—it has built up considerable expertise and competence that official institutions rely on.

The merger with Mitsubishi Bank helped to strengthen the position of the Bank of Tokyo whose situation had become difficult in recent years. The deregulation of financial markets during the 1980s had steadily eroded the bank's profits and, although it was less hit by bad-debt problems than many other financial institutions after the burst of the bubble,[6] its international rating was comparably low. Repeatedly, the bank's limited relationship with small- and medium-sized corporations in Japan was criticised[7]—a shortcoming which could be overcome by the merger due to Mitsubishi's large net of customers at home.

Japan's *city banks* cover a wide range of foreign exchange and international activities.[8] During the years of reconstruction and soaring economic growth the

Table 2.3 International activities of authorised foreign exchange banks[a]

Institutions	*Banks with representative offices*[b]	*Banks with overseas branches*[c]	*Banks with overseas affiliated firms*[d]
Specialised foreign exchange banks	1 (19)	1 (44)	1 (30)
City banks	10 (147)	10 (177)	10 (196)
Long-term credit banks	3 (34)	3 (32)	3 (47)
Trust banks	6 (36)	6 (41)	6 (55)
Regional banks	39 (57)	29 (54)	19 (26)
Regional banks II	9 (15)	4 (7)	2 (2)
Credit associations	1 (2)	1 (1)	1 (1)
Credit cooperatives	– (–)	– (–)	– (–)
Nōchū/Shōchū/Yugin	3 (19)	2 (4)	1 (2)
Total	72 (356)	56 (360)	43 (359)

a As of October 1993.
b In parentheses the number of representative offices.
c In parentheses the number of overseas branch offices.
d In parentheses the number of firms in which stakes of more than 50 per cent are held.
Source: Ikawa (1994:95)

banks concentrated on domestic business widely neglecting the opportunities international operations could offer. However, their attitude changed in the 1980s when a weaker economy, financial deregulation, ample liquidity and an increasingly competitive environment forced them to look for new sources of income. To participate in international markets they bought foreign companies and set up overseas subsidiaries. They sought to widen their commissions generating business but also specialised in arbitrage and other financial manoevres which—hinting at the breathtaking successes of Japanese industries and technologies in those years—became known as *zaitech* (*zai* being the Japanese word for finance).[9] Meanwhile, as Table 2.4 shows, for some of them the income generated overseas accounts for between 20 and 30 per cent of total income.[10]

All city banks are strongly linked to the big Japanese industrial groups or *keiretsu* serving as a *main bank* for their respective members. *Keiretsu* are seemingly loose groupings of manufacturers, distributors and finance companies whose relations are based on cross shareholdings, regular meetings of members' executives, interlocking directorships and countless unwritten obligations.[11] In 1990, the 8 biggest groups contained about 900 companies—excluding banks and insurance companies—with more than 2 million employees and a capital of more than ¥18,000 billion or about 32 per cent of all paid-up capital in Japan at that time.[12] Each *keiretsu,* in a sense, represents a cross-section of the Japanese economy. In following the 'one set principle' (Ito 1992:182) it aims to have at least one company in any type of business. To give an impression of the extent

Table 2.4 Global banking

Bank	*Rank*[a]	*Total assets*[b]	*Income generated overseas*[c]
Bank of Tokyo	18	271,214	42.1
Sumitomo Trust & Banking	24	168,589	15.6
LTCB	29	371,595	34.0
Dai-Ichi Kangyo Bank	32	581,638	29.0
Fuji Bank	34	571,083	30.0
Mitsubishi Trust & Banking	38	173,230	28.1
Sumitomo Bank	39	565,971	28.0
IBJ	41	433,282	27.2
Tokai Bank	47	347,966	24.6
Sanwa Bank	48	582,208	24.1

a Ranking according to the percentage of assets abroad.
b In billions of US dollars.
c In per cent of total income.
Source: The Banker (1996b)

of relationships Table 2.5 gives a rough outline of the main components of two big *keiretsu,* Mitsui and Mitsubishi, in the 1980s.

The *main banks* are at the heart of those *keiretsu* typically accounting for some part of funding for each member.[13] But, their importance is less determined by the funds they provide than by their informal influence and the far-reaching responsibilities they assume for the members.[14] Normally, there are four or five specialised financial institutions in addition, such as trust banks and insurance companies, which, for example, help fund large-scale investment projects and spread financial risks within the group (Calder 1993:142).

Two groups of city banks can be distinguished:[15] old and new *keiretsu* banks. Old *keiretsu* banks were all founded in the nineteenth century and have their roots in the pre-war *zaibatsu,* large conglomerates which were said to exert virtually perfect control of the Japanese economy until they were broken up under Allied command. This group consists, above all, of the 'Big Three', Sumitomo Bank, Mitsubishi Bank and Mitsui Bank, which were members of the equally named *zaibatsu*. Fuji Bank belonged to the smaller Yasuda *zaibatsu*. Further, this group contains the Dai-Ichi Kangyo Bank, whose predecessor, the Dai-Ichi Bank (which in 1971 merged with the Kangyo Bank) was the main bank of the Dai-Ichi *zaibatsu*.

New *keiretsu* banks' relations are said to be not as cohesive as the old ones where members often have inherited a shared name and 'a network of commitments and interdependencies' (Viner 1988:149) going beyond mere stock ownership. The new banks were the result of government-orchestrated mergers. For example, Sanwa Bank, the biggest one, was established in 1933 by the fusion of three banks, the same as Tokai Bank in 1941.

Japan's three *long-term credit banks*[16] are said to be 'strange beasts. They rank among the world's 40 largest banks, yet cannot accept deposits from the public. They are vigorous performers in the international bond markets, yet

Table 2.5 Industrial groups' activities

Business	Mitsui	Mitsubishi
Banking	Mitsui Bank*	Mitsubishi Bank
Trust banking	Mitsui Trust	Mitsubishi Trust
Life Insurance	Mitsui Life	Meiji Life
Marine & Fire	Taisho Marine & Fire	Tokyo Marine & Fire
Trading	Mitsui Bussan	Mitsubishi Shoji
Mining	Mitsui Kozan	
Forestry	Hokkaido Mining Ship.	
Construction	Mitsui Construction	Mitsubishi Construction
Food & Drink	Nihon Mills	Kirin Beer
Textiles	Tohre	Mitsibushi Rayon
Paper	Ohji paper	Mitsubushi paper
Chemicals	Mitsui Toatsu, Mitsui Petrochemical	Mb. Kasei, Mb. Gas chemical, Mb. Yuka, Mb. Jushi, Mb. Monsanto,
Oil		Mitsubishi Oil
Glass, cement	Onoda cement	Asahi Glass, Mb. Kogyo Cement
Steel	Nihon Seikojo	Mitsubishi Seiko
Non-ferrous metals	Mitsui Kinzoku	Mb. Kinzoku, Mb. Aluminium, Mb. Densen Kogyo,
Machinery		Mitsubishi Kakoki
Electronics	Toshiba	Mitsubishi Elect.
Vehicles	Mitsui Shipbuilding, Toyota	Mb. Heavy Industry, Mb. Automobile
Optics		Nikon
Real estate	Mitsui Real Estate	Mitsubishi Jisho
Transport & Communication	Osaka Shosen, Mitsui Storage	Nihon Yusen, Mitsubishi Storage
Department Stores	Mitsukoshi	

* After merger with the Taiyo Kobe Bank in 1990 renamed Sakura Bank. *Source*: Ito (1992: Table 7.4)

are banned from most securities businesses at home. They are privately owned, yet sometimes put the national interest before private profit' (*The Economist* 1987b). Despite financial deregulation and a loosening of the strict separation between different banking functions in recent years, this statement from the late 1980s still widely holds.[17]

In Japan, special long-term credit banks have existed since the end of the nineteenth century. Originally established as state-owned organisations to provide long-term loans and arrange securities issues for financing the country's industrial development[18] they were reorganised and privatised after World War II and, with the introduction of a new securities and exchange law, stopped trading and underwriting corporate bonds and shares. Industrial

Bank of Japan (IBJ) kept its name but became private in 1952. The Long-term Credit Bank (LTCB) was created by the merger of two state banks, Kangyo and Hokkaido Colonial Bank, at the same time. The third one, Nippon Credit Bank, was founded five years later from the remnants of the former Bank of Chosen, Japan's development bank in colonial Korea.

There are historically strong bonds between the long-term credit banks and the government, in particular with the Ministry of Finance and the Bank of Japan. IBJ has sometimes even been called an outpost of the ministry. The contacts of this institution to Japan's leading companies are unrivalled as well. The bank's biggest advantage is its independence. In contrast to the city banks it does not belong to any *keiretsu*. As a result, most of Japan's biggest companies are among its clients. Whenever an industry is envisaged for restructuring, or when members of different *keiretsu* plan a joint project, IBJ is an obvious candidate for the lead role due to its neutrality. Many managing directors and presidents of big companies came from IBJ.[19]

In reaction to the slowdown of economic growth in Japan in the 1970s, but also to circumvent domestic regulations, the long-term credit banks had started very early to diversify their business and turn their attention to the international capital markets with a focus on London as the only big market where commercial banks were not excluded from investment banking. In the beginning, their advantage there was the clientele of Japanese institutional investors, which helped them to gain a foothold in the eurobond market. Another help, in particular for IBJ, was the 'past as a government-owned institution responsible for attracting foreign capital to Japan' (Düser 1990:107) and the resulting wide network of international contacts. Meanwhile, similar to the big Japanese city banks and securities houses, all three have become known for their aggressiveness in expanding into various businesses pushing them to the top ranks of the euromarkets.

The group of *trust banks* in Japan contains seven Japanese[20] and nine foreign[21] banks. Like the long-term credit banks, trust banks provide long-term loans to industry. Together with life-insurance companies and the agricultural cooperatives' insurance federation they have the right to handle pension funds which is a most profitable source of income. Trust business has a long tradition in Japan. At the end of the nineteenth century, there were hundreds of trust companies. In 1923, the sector became more strongly regulated in reaction to widespread manipulation of funds. The industry's present structure dates back to the 1950s when, on the one hand, trust companies were allowed to engage in commercial banking activities and, on the other hand, a strict organisational separation between commercial banks, securities houses and trust banks was enforced.[22]

Trust banks' activities in Japan differ considerably from that of trust banks in Western countries, in particular in the United States. While the latter mainly focus on the management of trust property (deposit-taking business) the Japanese institutions concentrate on the investment of assets (lending business).

Thus, it is not the servicing of big customers but the accumulation of capital from retail banking which makes their core business. On the liabilities side, Japanese trust banks resemble savings banks with a large number of small deposits while their lending business looks like that of a long-term credit bank (Wohlmannstetter 1991:63). The breakdown of the bubble at the beginning of the 1990s left them like so many others on a mountain of bad loans, and the smallest, Nippon Trust, which was bought by Mitsubishi Bank in October 1994, needed substantial financial support to survive (see Baker, G. 1996a).

In 1970, six Japanese trust banks jointly opened a representatives' office in New York. This was the first moderate step to what would become a most impressive record in international banking. After a slow start, their activities gathered momentum in the 1980s. Their international financial transactions more than doubled between 1983 and 1986 and nearly doubled again in 1987 when the trust banks' share of purchases of foreign securities by Japanese investors reached about 70 per cent (Düser 1990:108). Meanwhile, as Table 2.4 shows, the two largest ones, Sumitomo Trust & Banking and Mitsubishi Trust & Banking, rank 24th and 38th respectively in global banking, and 2nd and 10th among the Japanese banks where Sumitomo Trust & Banking is only outperformed by the Bank of Tokyo, and Mitsubishi Trust & Banking is closely behind Fuji Bank but ahead of Sumitomo Bank and IBJ.

The list of Japanese banks with a strong foothold in foreign exchange trading would not be complete without mentioning the Norinchukin (Norin Chuo Kinko), the Central Cooperative for Agriculture and Forestry. In Japan, there is a three-tier framework of agricultural financial institutions. First, there are 2,871 agricultural and 1,564 fishery cooperatives, organised at the city, town and village levels.[23] Second, at the prefectural level there are 47 credit federations of agricultural cooperatives and 34 credit federations of fishery cooperatives. The Norinchukin at the top of the pyramid acts as a kind of central bank for these institutions.[24]

The cooperatives borrow from, and also lend to, local farmers and fishermen. Each cooperative is required to desposit about 70 per cent of surplus funds in the respective federation. Each federation, in turn is required to deposit at least 50 per cent of surplus funds in the Norinchukin (Viner 1988:176). This helps explain why the bank is one of the biggest institutional investors in Japan playing a major role in the money and capital markets.

In the mid-1980s,[25] the Norinchukin was the 6th largest Japanese bank and the 9th largest worldwide in terms of assets. In 1991, in the aftermath of the bubble, its total assets still were $248.3 billion, compared to Dai-Ichi Kangyo Bank with $524.5 billion, Sumitomo Bank with $406.1 billion and Fuji Bank with $396,5 billion, and it was still ranking 8th in Japan and 14th in the world (see *Euromoney* 1992). A large share of its funds is invested in foreign assets. For example, like other Japanese institutions the Norinchukin is a major buyer of US treasury issues (Viner 1988:177). Since 1984, it has had a branch in New York which in March 1996 had a staff of forty (The Banker 1996c: 51). In 1987,

it opened a foreign office in London and there is an affiliate in Zurich, too. In 1985, the Norinchukin made a comprehensive arrangement with the Bank of Tokyo including cooperation in many areas to exploit mutual advantages and become more competitive with the city banks (see Viner 1988:164).

In Tokyo, there are 90 *foreign banks* acting as authorised foreign exchange banks. Their number increased steadily up to the beginning of the 1990s and, since then, shows a slightly declining tendency.[26] Among them, in April 1990 there were 30 banks from the United States, 7 from France, 6 from Germany and the United Kingdom respectively, 5 from Canada and another 20 from Asian countries (Tateno 1993:462).

Most foreign banks derive the bulk of their income from foreign exchange business. Other operations are officially constrained or otherwise hardly accessible. There are limits to the types of business as well as to the number of branches. Corporate lending accounts for less than 3 per cent of total lending volume. Access to the management of pension funds is restricted. And to conduct investment banking and securities business, European universal banks need to establish a subsidiary.[27]

The golden age of the foreign banks was in the 1970s, when the high cost of oil as well as rising imports due to an increase in corporate investment activities led to a strong rise in the demand for foreign currency loans, so-called 'impact loans', while Japanese banks were not allowed to provide those funds.[28] Since then, the foreign banks often only managed to maintain their customer relationships by providing financial intelligence in areas where Japanese banks were still lacking experience, and bond, swap and foreign exchange trades became their most profitable activities (Viner 1988:169).

Beside the authorised foreign exchange banks *foreign exchange brokers* still hold a large market share in Tokyo. Their role is, at least in parts, historically explained. Until 1984, they were the only ones authorised to conduct foreign exchange business. There are eight foreign exchange brokers in Japan.[29] They match buy and sell orders from foreign exchange banks and other customers but are not allowed to trade on their own accounts. Some of them are closely linked to the country's six *tanshi gaisha,* or money market brokers.[30] *Tanshi* have been operating in Japan since their creation in 1902. They are private non-banking organisations with an exclusive licence from the Ministry of Finance, giving them a cartel-like position. They are endowed with borrowing privileges from the Bank of Japan, and the central bank uses its influence on them to exert a far-reaching control over the Japanese money market.[31] In 1993, one of the foreign exchange brokers took up money market business acting as a seventh *tanshi* (Kuroda 1995:403).

In two respects, the foreign exchange brokers' business has changed radically in recent years. On the one hand, the range of services they offer has widened. In addition to traditional foreign exchange transactions they now provide financial instruments like interest rate and foreign currency swaps, Forward Exchange Agreements (FXA) as well as interest rate and foreign currency

Table 2.6 Transactions through brokers in major foreign exchange markets[a]

Market	*April 1989*	*April 1992*	*April 1995*	*Electronic brokers in the spot market[b] 1995*
London	38	34	35	31
New York	43	35	30	29
Tokyo	52	37	28	32

a In per cent of total transactions.
b In per cent of total transactions through brokers.
Source: Bank of Japan (1996a: Table 11 and 12)

options. On the other hand, however, the broadening services did not prevent their market share from sinking. Between April 1989 and April 1995 it declined steadily from 52 to 28 per cent. While at the end of the 1980s, its share was high in international comparison, the picture has changed and now, although foreign exchange broking is on the retreat worldwide, its share in Tokyo is the lowest of all big centres (see Table 2.6).

There are several reasons given for this decline. The main ones are the general 'hollow out' of the Japanese financial system due to the weakness of many investors after the breakdown of the bubble and a general lack of competitiveness of the Tokyo market. In addition, during the last few years big Japanese institutional investors have experienced severe losses on their foreign assets as a result of the rising yen which, at least temporarily, made them hesitant about foreign activities. And, partly in reaction to developments at home, Japanese brokers themselves have begun to curb unprofitable activities and look for customers elsewhere.[32]

Another difficulty the brokers face is growing competition from electronic brokerage. This is a very young business and, worldwide, its market share is still very small. So far, it only covers spot transactions,[33] and of all spot trades through brokers in London, New York and Tokyo electronic brokerage makes up about 30 per cent (Table 2.6). However, one remarkable fact is its rise in Japan despite an above-average overall decline in foreign exchange broking in Tokyo. There, in October 1995, the volume of electronically conducted trade was reported to have risen to about 41 per cent of all dollar/yen transactions (Inoue 1995).

Worldwide, there are three leading providers of global electronic foreign exchange broking services so far.[34] The Electronic Broking Service (EBS) existing since September 1993 is backed by 15 owners, among them 13 leading banks. A large bulk of its transactions is in dollar/D-mark, D-mark/Swiss franc and D-mark/French franc trades. The London-based EBS was founded as a reaction to the earlier launch of two other systems: the Minex system, a consortium set up in April 1993 by 12 Japanese banks and 1 Japanese broker (Tokyo Forex) and marketed by Dow Jones Telerate, and Reuters'

2000–2 dealing system launched in May 1992. In particular, it was the fear of Reuters' already strong market position due to the fact that about 50 per cent of global foreign exchange turnover at that time was transacted through its main dealing systems, Reuters 2000–1 and Reuters Monitor, that forced the banks to act. From the beginning, a kind of division seemed to be evolving. EBS has a dominant position among the large banks in the interbank market which is mainly explained by its owners' nature, while Reuters has a strong position among their counterparts, especially the retail market banks.

This division was strengthened when in 1995 the Tokyo-based Minex Corporation decided to become the 15th partner in EBS. Minex has a strong position in Asia and claimed to have a share of 6 per cent of the daily broker turnover in dollar/yen trades in Tokyo. At the time of the merger, EBS/Minex, as is the name in Asia, was reported to hold a combined share of 38 per cent of the total broking market in Singapore compared to Reuters' 14 per cent (*The Banker* 1996a).

However, the strongest competition so far is not between the electronic brokers but with the voice brokers. The biggest advantage of electronic broking is costs. At a time when in Tokyo big customers were paying brokers commissions of ¥1,500 per $1 million traded, Minex was reported to charge ¥1,000 (Inoue 1995). The biggest disadvantage so far is liquidity. Electronic brokers find it difficult to generate liquidity and are said to be still best in handling small amounts.

CUSTOMERS

Due to existing regulations a large share of foreign exchange banks' customers are Japan-based.[35] Among them, the four big *securities houses* play a vital role. After their minor role at the start of industrialisation they are nowadays among the biggest and most influential institutions in Japan's economy. The Big Four, Nomura, Daiwa, Nikko and Yamaichi not only dominate the Japanese

Table 2.7 Top 10 countries ranked by stock market capitalisation*

Country	*Market Capitalisation*	*% of world total*
United States	5,082	33.46
Japan	3,720	24.50
United Kingdom	1,210	7.97
Germany	471	3.10
France	451	2.97
Canada	315	2.07
Switzerland	284	1.87
Netherlands	283	1.87
Hong Kong	270	1.77
Taiwan	247	1.63

* For 1994, in billions of US dollars.
Source: Fuchita and Osaki (1995: Exhibit 1)

Table 2.8 The Big Four in Japan's securities markets[a]

	The Big Four	*Market total*
Capital[b]	570 (41.2)	1,384.7 (100)
Number of stores	519 (18.4)	2,823 (100)
Number of employees	47,114 (38.7)	121,839 (100)
Bond trading volume[b]	1,062,853.9 (67.7)	1,570,071.3 (100)
• customers business[b]	18,647.0 (71.2)	26,171.4 (100)
• proprietary trading[b]	1,044,206.9 (67.6)	1,543,899.9 (100)
Share trading volume[b]	91,620.9 (42.5)	215,745.2 (100)
• customers business[b]	64,385.4 (43.1)	149,245.7 (100)
• proprietary trading[b]	27,235.5 (41.0)	66,499.5 (100)
Bond underwriting[b]	20,175.3 (67.8)	29,746.9 (100)

a End of March 1994.
b In billions of yen; in parentheses the percentage of market total.
Source: Kuroda (1995:351, Table 4–3–3)

stock market, which with $3.7 trillion in 1994 still ranked second worldwide accounting for 24.5 per cent of total world market capitalisation (Table 2.7). They also perform a vast range of international activities.

Nomura is the largest and the first, for example, to acquire a banking licence in the United Kingdom and the first to be granted primary dealer status in the United States. It has a strong home base and, including subsidiary broking companies, it is said to have a 60 per cent market share in the Tokyo stock market on a good day (*The Economist* 1987e). Official statistics show that the Big Four together on average account for over 40 per cent of all share trading in Japan and do more than 67 per cent of all bond trading (Table 2.8).

So far, the Big Four, like all securities firms in Japan, enjoy the advantages of fixed brokerage commissions at home. In Japan, there has been nothing like the Big Bang in the United Kingdom. Although there has been some liberalisation of commissions for large deals most of the transactions on Japanese stock exchanges are not in this category. Their commissions are still set by the Ministry of Finance which keeps them artificially high by international comparison (see, for example, Baum and Hayakawa 1994:576–7).

High commissions are not the only competitive advantage Japanese securities firms have. This shows particularly in the primary eurobond market where the Japanese reached a dominant position in the second half of the 1980s (*The Economist* 1987d). Their second advantage is placing power. Among their clients are Japanese institutional investors who are among the world's biggest investors. In addition, the firms have a wide branch of networks through which they can reach private investors in Japan.[36]

The Big Four are said to make about one tenth of their incomes overseas (Wohlmannstetter 1991:77). A substantial part of this is still coming from Japanese customers. However, recently, they showed a stronger orientation

towards proprietary trading, particularly in New York, where a declining Japanese demand for US treasury bonds in the aftermath of the bubble eroded their client base. With this strategy, in a sense, they are following a worldwide trend with some firms investing heavily in human capital as well as complex risk-management systems to keep profits up in a changing investment climate.[37]

So far, securities houses in Japan are not allowed to trade directly in the foreign exchange market. But, this rule no longer strictly holds since in the course of financial deregulation, in October 1993, the Big Four were allowed to establish trust bank subsidiaries. While before they had to turn to a bank outside their direct sphere of influence the new subsidiaries now handle a substantial part of their foreign exchange business.[38]

The biggest non-bank customers in the Japanese foreign exchange market are Japan's *general trading companies (sogo shosha)*. In 1986, when on the one hand the market was freed from major regulations and on the other finance was still a lot more trade-related than today the six biggest trading companies together at times accounted for as much as half of the daily trading volume. Their orders at that time often ranged between $500 million and $1 billion per day (Viner 1988:181).

The general trading companies are a phenomenon unique to Japan. There are over 1,700 trading companies who traditionally are the country's main importers and exporters, and although due to structural changes in the economy their share is slowly but steadily declining, in 1991 they still accounted for 43 per cent of all Japanese exports and 76 per cent of total imports (Hsu 1994:371–2).

Nine of those firms are known as general trading companies.[39] Together with the main banks they were the heart of the pre-war *zaibatsu*. While the latter were broken up in the post-war period, the general trading companies were allowed to regroup and, in addition, their activities were supported in many ways. Provided with scarce foreign exchange they dominated import business and became one of the main pillars in the reconstruction process.

Today, each of the six top general trading companies is a core member of a *keiretsu*. They deal with a wide range of products 'from instant noodles to jet planes' (Tabb 1995:350) and have huge information and transaction networks .With their traditional activities being the import and export of commodities their businesses today are not restricted to trade. Diversified investments all over the world, which in recent years have been concentrating more and more on Africa's, Latin America's and Asia's emerging markets, make the bulk of their activities. 'They build nuclear reactors and oil refineries covering every step from planning and financing to construction and supplying materials' (Tabb 1995:350).

Accordingly, their financial activities are impressive, too. They hold stakes in many firms worldwide, have their own finance companies in many countries and provide a variety of invaluable financial services for *keiretsu* members (Eli 1994:272–4). They can be considered as 'quasi banks' in that they borrow from banks and lend to corporations in- and outside the *keiretsu* (Hsu 1994:372).

In principle, the financial functions they fulfil are twofold: on the one hand they provide short-term assistance to customers to overcome temporary liquidity shortages in the more traditional realm of trade finance; on the other hand they grant credit to suppliers and producers as well as for investment projects, arrange complex deals of simultaneous exports and imports where finance is one part of the package and engage in all kinds of project finance. In addition, they offer financial expertise and information advising, among other things, clients in mergers and acquisitions (Hsu 1994:373).

Since major restrictions on overseas financial activities of non-financial institutions in Japan were removed in 1984 trading companies heavily engaged in *zaitech* operations worldwide.[40] Even before they had been known as 'large and well-informed traders in the foreign exchange market' (Walmsley 1983:46) and now they started to exploit their knowledge systematically. This does not only hold for the biggest among them. For example, Hanwa, a medium-sized company, has become famous for its breathtaking *zaitech* operations. For 1985, its pre-tax recurring profits were ¥14.2 billion of which ¥9.8 billion were derived from foreign exchange speculation (Viner 1988:180).

However, general trading companies do not depend as much on the foreign exchange market as most other market participants and their fate is not to the same extent linked to the ups and downs of the currency carousel. Due to their large network of intra- and intercompany relations worldwide they are able to circumvent the market whenever it seems advisable, which renders them highly flexible in eliminating, or establishing, foreign exchange risks.

In principle, the last argument holds for all large *multinational enterprises* and industrial groups. Japan's big companies have long pretended not to engage in *zaitech* operations. But, this did not hinder them from taking every opportunity to benefit from financial deregulation. For example, after the abolition of the Real-Demand Rule, although still forced to go through banks for each foreign exchange transaction, Japanese companies could be observed eagerly opening up their own dealing rooms to make the most of market liberalisation (Martineau 1987). And, once the trading companies had taken the lead in setting up financial corporations overseas Japan's big industries followed. By the end of 1986, in this way more than 50 finance companies had been established in London and became active participants in the international financial markets. At that time, for some corporations like Toshiba, Sharp or Sanyo, incomes from *zaitech* made up over 70 per cent of pre-tax profits, for Nissan it was more than 150 per cent (Viner 1988:225).

However, not all of them proved successful. Among the most famous losses in world financial markets in recent years, Japanese companies rank first, with Showa Shell Sekiyu reporting $1.58 billion losses from foreign exchange forward transactions in 1993 and Kashima Oil $1.45 billion from trading in currency derivatives the same year. The amount of the losses is remarkable as well as the fact that in both cases—as well as in another one that attracted a lot of attention, Nippon Steel with $130 million losses—they

were made in the foreign exchange and not, for example, in the commodities markets.

In recent years, Japanese companies have become less dependent on banks despite all remaining regulation. The reasons for this change are manifold: on the one hand, the bursting of the bubble and a weak economy generally reduced the need for bank credit; on the other hand, more and more firms started to raise money directly in the capital markets. All this stiffened competition among banks giving big customers a much stronger position than before. One result is that banks have become more dependent on their customers and, in particular, more willing to take risks for them. With respect to foreign exchange trading this is a worrying aspect since, in Japan, the traditionally strong linkages between banks and industries are regularly abused by some non-banks that engage heavily in currency speculation. The banks, which cannot always cover their exposure in time, are sometimes left with a large risk burden (see also Martineau 1987). The recent developments threaten to reinforce these tendencies.

One influential group of customers are the big Japanese *institutional investors,* the insurance companies and pension funds. In 1995, the insurance industry in Japan consisted of 25 life insurance companies and 14 non-life insurance companies. Life insurers' total assets amounted to over ¥170,000 billion that year (Baker 1996c). According to the Tokyo Stock Exchange they own about 12 per cent of the equity market's share (Dawkins 1994a). In 1991, the biggest eight of these companies[41] together had a market share of about 70 per cent in life insurance premium income and 80 per cent in assets (Hsu 1994:177).

Japan's life insurers have long dominated world financial markets by the sheer weight of their assets. The first company, Meiji Life, was founded in 1881. A century later the industry's assets accounted for about ¥30 trillion. This number doubled by December 1986 and reached ever new heights during the second half of the 1980s when capital gains on the insurers' holdings of equities and land soared.[42] However, they were badly hit in the beginning of the 1990s and their profits were eroded in two ways: the bursting of the bubble and the resulting fall in stock and land prices weakened their capital base in general, and the sharp rise in the yen against other major currencies brought them big losses on their foreign assets.[43]

The non-life insurance companies did not suffer to the same extent from the after-effects of the bubble and the rising yen. This was for two reasons. First, they are much smaller than the life insurers, and by the end of March 1994 life insurers' total assets were over ¥167 trillion while non-life insurers' assets were about ¥27.6 trillion (Kuroda 1995:378). Second, both groups differ with respect to their investment stategies. Non-life insurers' liquidity shows much more variation than that of life insurers. Accordingly, the latter concentrate on long-term investments in contrast to the non-life insurers which prefer shorter maturities and more liquid assets. This helps explain why, for example, the four biggest

non-life insurance companies[44] all managed to maintain their AAA rating when the big life insurers fared much worse (see *The Nikkei Weekly* 1996a).

The life insurance companies started to invest in foreign securities in 1971 (Noguchi *et al*. 1991:406). However, their overseas activities were limited to 10 per cent of total assets. In 1986, in the course of the general liberalisation process, the Ministry of Finance widened this limit raising the percentage of new assets that could be held in foreign securities to 30 per cent. But this range was never fully exploited. With the bursting of the bubble and the rising yen Japans life insurers became more cautious and, for a long while, considerably reduced their overseas investments (see Table 2.9).

Recently, a moderate reversal of this trend can be observed initiated by the government. In August 1995, the Ministry of Finance announced various deregulatory steps to promote insurers' investment in foreign assets. The aim was to dampen the yen appreciation, particularly against the US dollar. The measures included, among others, a liberalisation of foreign-currency denominated external loans by insurance companies and the abolition of the so-called 50 per cent rule which limited the participation of insurance companies in syndicated yen-denominated external loans to 50 per cent. The result was a slight increase in foreign securities purchases by the Big Three, Nippon Life, Dai-Ichi Life and Sumitomo Life (*The Nikkei Weekly* 1996b).

One of the most valuable businesses of life insurance companies in Japan so far is the management of *pension funds*. After the trust banks, the life insurers are the second largest group of pension fund managers. Until April 1990 these two were the only ones allowed in this business.[45] Japan has the fastest growing pension business in the world. One of the country's biggest social and economic problems is the ageing of a large part of the population.[46] There are public and private pensions.[47] At the end of March 1993 ¥110 trillion was paid into the central government's special account for the employees' pension system and national pension system, of which ¥19.46 trillion were lent to the government's main public pension fund, the Pension Welfare

Table 2.9 Distribution of life insurers' assets[a]

Assets	*Fiscal Year 1989*	*Fiscal Year 1995*[b]
Loans	35.4	37.3
Stocks	21.8	18.9
Bonds	8.5	18.0
Foreign securities	15.3	6.8
Call loans, cash, deposits	6.0	6.3
Others	13.0	12.7
Total assets[c]	116.15	178.52

a As percentage of total assets,
b As of February 1995. c In trillions of yen.
Source: Ogawa (1995a).

Service Public Corporation, or Nempuku. Nempuku, a quasi-governmental institution which is affiliated with the Ministry of Health and Finance, in turn invested the money through life-insurance companies or trust banks.[48] Corporate pension funds at that time held ¥35.41 and reached about ¥38.4 trillion in assets at the end of March 1995 (Suzuki 1996b).

Recently, the pension market has moved considerably. Over the years, Japanese fund management was known for its poor performance. Sheltered by an oligopoly structure, limited by administrative guidance and cocooned in a web of corporate relations and liabilities portfolio managers had developed a low-risk philosophy and rarely cared about yields and performance.[49] Increasing deregulation has opened up the market to new competition, and big losses in the aftermath of the bubble have heightened the awareness of performance. As a result, advisory firms see their market share growing and in particular foreign companies, which are not only offering higher returns but also a better disclosure, are gaining ground.[50]

One of the largest groups of institutional investors beside pension funds and insurance companies are the *investment trusts*. Those institutions are collecting funds from the general public, pooling them and then channelling them into trust funds for investing in securities.[51] In Japan, there are 14 bond and stock investment trusts, either in the form of unit trusts or open trusts, which in 1990 together held ¥45.9 trillion in assets. The four largest ones bear the names of their parent companies, Nomura, Daiwa, Nikko and Yamaichi. Until 1962, all investment trusts were managed directly by the securities companies. But, abuses like churning, distorted prices and other manipulations led the Ministry of Finance to order the separation of the investment trust departments and their transformation into separate legal entities.[52]

After the bursting of the bubble the investment trusts, too, experienced severe losses. This helps explain why investors' interest in conventional stock funds has declined sharply in recent years. In 1995, the Ministry of Finance took some steps to ease the firms' situation. Among those were the permission to trade derivatives for their own account—so far they only had been allowed to buy and sell listed futures and options for hedging purposes—to sell stock short under certain conditions and to be no longer restricted in investments to special countries (Nishimura 1995).

Fund activities are often blamed in Japan for their destabilising behaviour in the currency markets. However, normally respective remarks do not refer to domestic investment funds but to their overseas counterparts, in particular to socalled hedge funds (*hejji fando,* and here especially American funds, *beikei fando*). What are hedge funds? Although, in recent years, some of them have set up operations in London and Paris, their roots are in the United States, where they have a long history. The oldest is AR Jones which was founded in 1949 (Bennett and Shirreff 1994:29). Hedge funds are 'privately subscribed funds that take highly leveraged speculative positions or that engage in arbitrage. Most of these are largely unregulated offshore funds' (Goldstein *et al.* 1993:26, footnote 8).

It is the high leverage and the lack of regulation that distinguish those funds from other institutional investors. Hedge funds are free to use complex, speculative instruments to maximise investors' returns and therefore are able to take more risks than other market participants, such as life insurers or pension funds, which are supervised by national authorities. Hedge funds specialise in short-selling, a strategy originally developed to lower or eliminate price risks by building up a compensating position. Short-selling means that an investor sells a position forward in the hope that its price will fall, so that at the time of delivery he can acquire it at a lower than agreed price in the spot market. Traditionally focussing on relative returns of US stocks—hedge funds were the first investors allowed to short stocks in the United States (Bennett and Shirreff 1994:29)—nowadays those funds are often considered as mere gamblers in the goverment bond and currency markets.

Hedge funds were brought into the public consciousness with the currency turmoil in Europe in September 1992 when George Soros' Quantum Fund was said to be among the main players who forced the British pound out of the Exchange Rate Mechanism (ERM) of the European Monetary System (EMS). During the EMS crisis, the Quantum Fund group was reported to have made a profit of $1 billion out of sterling's fall with a $10 billion 'bet' on it (see Roberts 1995:18). In those days, traders' incomes sometimes rose to incredible heights. For example, in 1993, one UK hedge fund manager in his first year on the job was said to have made more than $30 million (Baker, M. 1995:144). These and other success stories created some myths around hedge funds and the men running them. In particular, for Japanese observers George Soros has a special aura since his spectacular speculation in the yen after the Plaza Agreement in 1985 (see Dickson and Harverson 1993).

Since the heyday of the currency turbulences in Europe the markets, and with them the hedge funds, have seen a kind of self-correction. There were two developments. On the one hand, returns fell and investors became more cautious. On the other hand, encouraged by the funds' earlier successes there were many newcomers competing for the smaller pool of capital. Between 1992 and 1994 the number of hedge funds worldwide almost doubled from about 440 to 800, and was estimated to be around 1,300 in June 1995. At the same time, total assets in hedge funds fell from their peak of $100 billion at the end of 1993 to $80 billion by June 1994 (Celarier 1995:43). Therefore, the attention payed to those funds in Japan sometimes seems exaggerated.[53]

However, there are some hints that the influence hedge funds exert in particular on the Japanese market still can become considerable at times. For example, in 1995, it was observed that investors outside Japan tried to exploit low yen interest rates by buying US assets against yen liabilities, i.e. by borrowing yen to finance positions in US bonds. At that time, the difference between interest received and interest paid in those trades could become 5 per cent or more. Part of those activities were reflected in the US balance-of-payments statistics. This showed that about 40 per cent of the $100 billion

net securities inflow into the United States came from the British West Indies and the Netherlands Antilles, the legal residence of some US-based hedge funds (Bank for International Settlements 1996b: 102).

Coming back to financial institutions and investors in Japan, seen as a whole, many of them face a very difficult situation since the bursting of the bubble with some in a permanent struggle for survival. Obviously, an urgent need for higher returns makes them already forget the caution that ruled their behaviour during the first years of the downturn. Investors' growing awareness of performance and their ongoing search for new sources of income has increased their willingness to take risks once again. One effect of this change in attitude is that, after many years of slow growth, and even stagnation, the foreign exchange market in Tokyo has regained some of its former vitality, and, as the following chapter will show, in some market segments trading volume soared.

3

MARKET SEGMENTS AND TRANSACTIONS

Every three years, the central banks and monetary authorities of countries with large and medium-sized foreign exchange markets conduct a survey of market activity under the auspices of the Bank for International Settlements (BIS). The latest report published in May 1996 (Bank for International Settlements 1996a) contains data referring to turnover in April 1995 and open positions at the end of March the same year. More than 2,400 institutions in 26 countries participated in the survey, among them all at that time authorised 345 foreign exchange banks and 11 brokers in Japan.[1] Before turning to the statistics in detail, some general remarks concerning the methodology and international comparability of the survey seem necessary.

First, the survey allows only a momentary glimpse at a market which is permanently in motion and where actors, amounts and types of transactions can vary considerably from month to month. Aware of this the Bank for International Settlements asks the countries' representatives to characterise the nature of turnover in their respective market in the month the survey is conducted as well as in the preceding six months. For the 1995 survey most countries reported a normal or below normal turnover in April and a steady or increasing turnover in the preceding months, for Japan it was characterised as normal and steady. However, this can only give, at most, a rough indication of the prevailing conditions. For example, the *Nihon Keizai Shimbun* wrote on 15 March 1995 (i.e. two weeks before the survey started) that the preceding two weeks had been a time of lasting dollar weakness and ongoing turbulence in the European Monetary System where the D-mark/dollar turnover with brokers in Tokyo had more than doubled from an average daily $4 billion in February to over $8.7 billion (*Nihon Keizai Shimbun* 1995b).

A second remark refers to the type of participants. Due to existing regulations in Japan, the classification allows no direct comparison of counterparties between the big centres worldwide. The BIS classification distinguishes three groups of counterparties: other dealers, other financial institutions and non-financial customers. The first group includes commercial and investment banks and securities houses which act as market makers or intermediaries

and other active dealers such as subsidiaries of insurance companies (Bank for International Settlements 1996a: 44). For Japan, this group only contains the authorised banks and brokers. Therefore, the composition of groups deviates from that in other countries.

The third remark concerns published volumes. They only represent a fraction of total foreign exchange business worldwide. Participants have been asked to report all arm's-length transactions which means trades in which the dealer is indifferent as to the counterparty. This would include in-house deals and deals with other orifices of the same institution only as far as the trader was equally willing to conclude the deal in question with a fully independent party (Bank for International Settlements 1996a: 37). Thus, to get a true picture of foreign exchange trading, further information, for example of the volume of trade of connected firms and within general trading companies and other big institutions, is needed—for Japan probably more than for other countries with smaller enterprises and less opaque industry relations.

The question of volumes has still another aspect: the basis for reporting turnover data for the survey is the location of the office where the deal was done, not where it was finally booked. The idea behind this is that companies sometimes book transactions in a different location and after the event it can be difficult to identify the deal's origin (Bank of England 1996a: 31). Therefore, it is not the head office in Japan which is reporting the activities of local offices abroad. Thus, since many Japanese in Japan prefer to shift foreign exchange activities overseas to circumvent existing restraints and regulations at home the survey may not give an accurate picture of the extent of trades originating in, or initiated from, Tokyo.

One general characteristic of the Japanese foreign exchange market already mentioned is the extraordinary growth after its liberalisation during the 1980s. Within a few years, Tokyo became a major world trading centre ranking only third behind London and New York. For example, while in 1980 the estimated *annual* trading volume in Tokyo was around $579 billion, in 1995, the estimated *daily* turnover in this market had become more than $162 billion (Table 3.1).

However, the data also show the limits to this process. Between 1989 and 1992 a significant slowdown in market growth could be observed. While, for example, between 1986 and 1989 transactions in the Tokyo foreign exchange market had increased by more than 130 per cent, over the following three years they grew only by 8 per cent. From 1992 to 1995 a clear recovery took place and turnover rose by 34 per cent. Nevertheless, it was still lagging behind that of London and New York where volumes increased by 60 and 46 per cent respectively.

There were several reasons given for the slowdown (compare Bank of Japan 1993a: 39–40). First, it was said to reflect a worldwide trend in that a similar decline in growth rates was experienced in other centres as well. But, this does not hold for the major markets. The numbers for the United Kingdom and the United States hardly differed between the 1992 and the 1995 survey and smaller markets such as Singapore and Hong Kong grew much stronger—

Table 3.1 Average daily foreign exchange market turnover in selected countries[a]

Country	April 1989 Amount	%	April 1992 Amount	%	1989–92[b]	April 1995 Amount	%	1992–95[b]
United Kingdom	184.0	26	290.5	27	58	464.5	30	60
USA	115.2	16	166.9	16	45	244.4	16	46
Japan	110.8	15	120.2	11	8	161.3	10	34
Singapore	55.0	8	73.6	7	34	105.4	7	43
Hong Kong	48.8	7	60.3	6	24	90.2	6	50
Switzerland	56.0	8	65.5	6	17	86.5	5	32

a In billions of US dollars.
b Percentage change.
Source: Bank for International Settlements (1996a: Table F–7)

in part at the expense of Tokyo.[2] Looking back it appears as if much of the observed worldwide decline of those years can be attributed to the weakness of the Japanese market alone.

A second reason named was a deteriorating investment climate both in Japan and the rest of the world which let the volume of cross-border capital movements shrink thereby reducing the need for foreign exchange transactions. This holds particularly for the activities of Japan's big institutional investors who in the second half of the 1980s had benefited from higher returns abroad. They partly turned back to Japan when sinking interest rate differentials and an increasing awareness of the damage of currency losses on their dollar investments during the yen appreciation *(endaka)* reduced the attractiveness of those investments.

Third, the dollar/yen exchange rate had remained relatively stable in this time compared to its steep fall in 1985 and 1986 (see Figure 3.1) thereby reducing the incentives for active position taking in these currencies. However, as will be discussed later on, this is at least arguable as, normally, the yen is showing a higher variability than other G7 currencies offering better profit opportunities than, for example, major European currencies. The fourth factor was the described weakness of Japanese banks after the breakdown of the speculative wave that hit the economy in the second half of the 1980s (see Ministry of Finance 1993:100). This left the banks with a bulk of bad loans and huge losses that made them more than their competitors elsewhere shun market risks. But, the data also show that this attitude did not last. In the 1995 survey growth obviously has resumed a higher path and foreign exchange trading in Tokyo is now up again.

With respect to the currencies traded there are some variations across countries. In Japan, as in the United States and Germany, domestic currency business accounts for a large percentage of turnover (Table 3.2). This is partly explained by the yen's role as vehicle currency in cross-currency trades and with its regional importance in Asia. In particular, dollar/yen trading

* Monthly averages
Source: International Monetary Fund.

Figure 3.1 The yen/dollar exchange rate 1985–95*

Table 3.2 Currency pairs traded in major foreign exchange markets[a]

Country	*Domestic*[b]		*$/DM*		*$/¥*		*Others*	
	1992	*1995*	*1992*	*1995*	*1992*	*1995*	*1992*	*1995*
United Kingdom	24	16	24	22	12	17	40	45
USA	89	86	33	30	21	20	11	14
Japan	73	81	14	12	67	76	12	7
Singapore	3	6	29	25	27	25	41	44
Hong Kong	15	17	27	25	25	29	33	29
Switzerland	47	41	23	23	6	7	24	29
Germany	83	76	60	50	3	4	14	20

a Percentage shares.
b The domestic currency against all other currencies.
Source: Bank for International Settlements (1996a: Table F–5)

tends to be concentrated in the region. However, the large share of yen business is in part also a sign of the closed nature of the Japanese market which is in marked contrast, for example, to London.

In London, nowadays, the pound sterling's share is comparably small and steadily declining while trading in other than the domestic currency has risen strongly in recent years. In Tokyo, the domestic currency share has grown, from 73 per cent in 1992 to 81 per cent in 1995. This indicates an ongoing internationalisation of the London market on the one hand and a return to more nationalisation in

Japan on the other (Bank for International Settlements 1996a: 11). The latter is also confirmed by the relatively narrow range of currencies traded in Tokyo with the dollar/yen business playing a dominating and still growing role.

If, nevertheless, the yen is the third most widely traded currency worldwide, this reflects, above all, the size of the Japanese economy and the financial power of some of its actors. In April 1995, the yen was involved in two of the ten most widely traded currency pairs. However, here again, a striking difference to other countries can be found. While the first and second most important currencies worldwide, the D-mark and the US dollar, are traded in large quantities against a wide range of other currencies yen business is more or less limited to these two hinting again at its narrowness (Table 3.3).

Table 3.3 Foreign exchange market turnover worldwide by currency pair[a]

Currency pair	*Spot*	*Outright forwards*	*Foreign exchange swaps*
USD/DEM	29 (30)	19 (22)	17 (19)
USD/JPY	18 (16)	22 (20)	24 (25)
USD/GBP	5 (9)	6 (9)	8 (12)
USD/CHF	5 (6)	5 (6)	6 (7)
USD/FRF	2 (1)	5 (2)	7 (4)
USD/CAD	2 (2)	4 (3)	4 (5)
DEM/FRF	6 (..)	2 (..)	1 (..)
USD/AUD	2 (1)	2 (2)	3 (3)
DEM/JPY	4 (4)	3 (3)	0 (0)
DEM/GBP	4 (5)	1 (3)	0 (1)
Other[b]	23	31	30
All currency pairs	100	100	100

a Percentage shares as of April 1995, in parentheses as of April 1992.
b Including the DEM/FRF share and excluding the DEM/CHF share for 1992.
Source: Bank for International Settlements (1996a: Table F–4)

SPOT AND FORWARD MARKETS

Another characteristic of the Japanese market is the development of market segments. Traditionally, foreign exchange trades are distinguished into spot, forward and swap transactions.[3] A spot transaction is defined as an exchange of two currencies for settlement within two business days (Bank for International Settlements 1996a: 16). In contrast, an outright forward transaction is an exchange for more than two business days with the period agreed on by the counterparties stretching days or even months or years into the future and the exchange rate fixed at the time the transaction is agreed. A swap is defined as an exchange of two currencies for a specific period and a reversal of that exchange at the end of the period consisting either of a combination of a spot and a forward leg or of two forward trades with different maturities.

Until recently, the spot market used to be the most important foreign exchange market segment. For example, in April 1989, it accounted for 59.5 per cent of total turnover worldwide. But, since 1992, its share declined considerably and in April 1995 it was only 43.3 per cent. In Tokyo, spot trading had always played a smaller role, and accordingly showed a less pronounced decline, with a market share of 41.4 per cent in April 1989 which sank to 34.2 per cent in 1995 (see Table 3.4). The most widely traded currency pair in the spot market worldwide is the US dollar against the D-mark which accounted for 29 per cent of turnover in April 1995, followed by dollar/yen trading which in recent years showed an increase from 16 per cent in 1992 to 18 per cent in 1995.

With respect to outright forward transactions the picture looks different. Those trades account only for a small part of the market. Compared to other types of contracts outright forwards have the disadvantage of low flexibility. Due to the longer period the risks involved are higher and since they are mostly tailor-made to meet customers' needs there are often non-standard amounts or maturities that make it difficult to unwind exposures. In addition, a smaller number of participants and lower volumes in that market 'imply somewhat less competitive pricing' (Bank for International Settlements 1996a: 17). Thus, above all, outright forwards are used by actors that have no alternatives, i.e. no direct access to the spot and swap markets, and by market makers executing those trades for their clients and then, normally, closing the resulting positions.

Outright forwards serve many purposes. They are widely traded for hedging financial and trade risks of commercial customers. This helps explain why, in general, this market segment has a relatively large share of business conducted with non-financial counterparts (see Table 3.5) with a strong focus on local business and the domestic currency more involved than elsewhere. Due to the fact that in Japan companies so far are not allowed to conduct foreign exchange business by themselves this holds particularly for Tokyo. There, in April 1995,

Table 3.4 Traditional foreign exchange market segments*

	March 1986		*April 1989*		*April 1992*		*April 1995*	
Category	*Global*	*Tokyo*	*Global*	*Tokyo*	*Global*	*Tokyo*	*Global*	*Tokyo*
Spot	123	19	427	46	541	48	680	55
	(59.7)	(39.6)	(59.5)	(41.4)	(50.3)	(40.0)	(43.3)	(34.2)
Outright forward	n.a.	n.a.	22	7	70	9	115	17
			(3.1)	(6.3)	(6.5)	(7.5)	(7.3)	(10.6)
Swaps	n.a.	n.a.	165	59	457	63	777	89
			(23.0)	(53.2)	(42.5)	(52.5)	(49.4)	(55.3)
Total	206	48	718	111	1,076	120	1,572	161

* Reported turnover net of local inter-dealer double counting. Daily averages in billions of US dollars, in parentheses as percentage of all traditional segments respectively. *Source*: Bank for International Settlements (1996a: Table 2–A, 2–B, 2–C, 2–D)

Table 3.5 Foreign exchange turnover by counterparty, April 1995*

Type of contract	*United Kingdom*		*United States*		*Japan*	
	local	*cross-border*	*local*	*cross-border*	*local*	*cross-border*
Spot						
• with other dealers	47.9	97.9	32.2	50.1	12.9	30.3
• with other financial institutions	15.6	14.1	15.6	16.8	2.9	0.5
• with non-financial customers	5.3	5.6	10.0	9.2	7.9	1.0
Forwards						
• with other dealers	5.8	10.5	3.2	7.2	1.8	5.7
• with other financial institutions	9.7	2.8	5.7	3.0	1.6	0.2
• with non-financial customers	2.4	2.5	6.5	2.2	7.2	0.3
Swaps						
• with other dealers	53.8	133.0	15.1	30.6	20.3	47.5
• with other financial institutions	22.0	20.4	10.3	13.5	7.4	1.3
• with non-financial customers	8.1	6.2	5.6	7.5	11.4	1.2

* Daily averages of net turnover in billions of US dollars.
Source: Bank for International Settlements (1996a: Table 1–I, 1–J, 1–K)

outright forward transactions accounted for over 10 per cent of the market compared to 7.3 per cent worldwide. Locally, dealing with customers played by far the biggest role, while in cross-border trades nearly all business was conducted with other dealers. In comparison, in New York, forward activities were more evenly spread among counterparties. In the United Kingdom, trading with other dealers and other financial institutions played a much bigger role than customers' business hinting again at the different nature of the three markets and London's importance as an international financial centre. With respect to the currencies involved in forward trades there has been some shift in recent years (see Table 3.3). While in 1992 the dollar/yen business still held the second rank among all currency pairs, accounting for 20 per cent of total turnover, in 1995, it replaced the dollar/D-mark at the top of the list.

THE ROLE OF FOREIGN EXCHANGE SWAPS

One of the most striking facts is the large and growing share of swaps both in Tokyo and in yen trading worldwide. Of the overall forward market, meanwhile, swaps account for 85 per cent of transactions (Bank for International Settlements 1996a: 18). In recent years, they have replaced the spot market as the biggest foreign exchange market segment. In April 1992 global spot trading had a share of about 50 per cent and swaps were around 42 per cent, in April 1995 the spot market had shrunk to 43 per cent and swaps had risen to 49 per cent (Table 3.4).

In Tokyo, swaps have always played a bigger role. The first official market data available from March 1986 do not show the share of swap trades, but spot transactions at that time accounted only for 39.6 per cent hinting at their relatively minor importance. In 1989, the share of swaps made clearly more than half of all trades and in April 1995 it had risen to over 55 per cent. In the latest statistics spot transactions have shrunk to a mere 34.2 per cent. A similar picture can be found for the global currency composition of trades. Worldwide, dollar/yen swaps are at the top with 24 per cent of total foreign exchange swap turnover, followed by dollar/D-mark swaps with 17 per cent and dollar/British pound swaps with 8 per cent (Table 3.3).

There are four main reasons for this phenomenon. On the one hand, reflecting an overall trend, the rising share of swaps in Japan and in yen trading worldwide in recent years is a sign of growing sophistication in investors' liquidity and currency risk management (Bank for International Settlements 1996a: 19). On the other hand, it is said to reflect a high level of short-term money market operations and interest arbitrage between currencies. For example, Japanese banks which find more favourable conditions in foreign money markets than domestically may swap yen into US dollars to invest them at higher rates in the United States. Or they replace costly foreign currency liquidity by cheap and ample yen liquidity, as has been the case in 1995 when international banks imposed a 'Japan premium' on dollar deposits with Japanese banks (see Bank for International Settlements 1996b: 105). Still another variant had played an important role at the time when interbank rates in Japan were strictly regulated. Then banks supplied funds to one another in the form of currency deposits which they swapped into yen thereby circumventing the interest rate regulation prevailing in the domestic market (see Hamada and Horiuchi 1987:255–6). A third explanation for the high share of swaps are the still existing constraints in Japan. Since all foreign currency trades so far have to be done through an authorised foreign exchange bank or broker there is a much higher share of customer business in Tokyo than elsewhere. As a result, banks have more open positions from forward contracts with customers covering most of them by swaps (Tatewaki 1991:73).

A fourth explanation which does not hold for the Japanese market alone is the role swaps nowadays play in banks' position taking in search of short-term profits from exchange rate fluctuations. Dealers wanting to hold an open position for an undefined short time period buy or sell the currency spot or forward and then, when expectations do not fulfil in time or prospects continue to look favourable, prolong the position by a swap. This allows them to keep a high degree of flexibility at lowest costs. As the Bank for International Settlements (1996a: 18) puts it:

> …foreign exchange swaps are often initiated to move the delivery date of foreign currency originating from spot or outright forward transactions to a more optimal point in time. By keeping maturities

to less than a week and renewing swaps continuously, market participants maximise their flexibility in reacting to market events.

In that way, as will be shown in detail later, they manage not only to profit from short-term exchange rate changes but also from variations in interest rate differentials between currencies or, to put it the other way around, the swap rate.

The latter aspect is sometimes regarded as of minor importance. The reason lies in the nature of those trades. A swap can be considered two ways: as a temporary exchange of two currencies or as a simultaneous borrowing and lending operation. For example, a bank is buying D-mark against dollars for spot value and at the same time agrees to buy back the dollars against D-mark at a fixed future date. The loss or gain of this transaction is determined by the swap rate, i.e. the difference between the spot and the forward rate, and this, in turn, due to a strong interdependence of money and foreign exchange markets worldwide, is equal to the difference in the interest rates between the two currencies.[4] The swap alone contains no currency risk, since it establishes both a long and a short position in a currency of equal amount and for the same maturity at the same time. As the Bank for International Settlements (1996a: 18) writes: 'Since currency risk is replaced by credit risk, the transaction is conceptually different from spot transactions.' Most explanations of the high share of swaps in today s markets concentrate on this credit view.

While the swap itself bears no currency risk, its use in combination with a spot or outright forward transaction establishes an open position that, if not hedged or compensated otherwise, is exposed to risk. The maturity breakdown of forward transactions hints at the role of those activities (Table 3.6). The bulk of trades here is of very short-term nature. Both worldwide and in Japan, for swaps, maturities of seven days or less account for about 70 per cent. In

Table 3.6 Maturity breakdown of outright forward and swap transactions*

Type of contract	*United Kingdom*	*United States*	*Japan*	*Total*
Outright forwards				
• Up to and including 7 days	70	57	47	53
• Over 7 days and up to and including one year	29	41	50	46
• Over one year	1	2	3	2
Swaps				
• Up to and including 7 days	73	70	69	71
• Over 7 days and up to and including one year	26	28	30	28
• Over one year	1	2	1	1

* Percentage change of country's total transactions for the respective type of contract.
Source: Bank for International Settlements (1996a: Table 1–L, 1–M)

contrast, for outright forward transactions maturities of more than one week account for roughly half of all deals worldwide; in Japan even more than 50 per cent are of longer-term nature. In foreign exchange markets today, swaps for short-term position taking make a large part of banks' daily business, and with Tokyo under current regulations being more than other centres an interbank market those trades' influence here appears particularly strong.

FUTURES AND OPTIONS

The central bank survey of spring 1995 for the first time included detailed information about global activities in derivatives markets.[5] In contrast to turnover data the basis for reporting here was book location. Another difference for Japan was that it did not only cover the authorised foreign exchange banks and brokers but also ten securities houses, the Big Four as well as six foreign companies (Bank of Japan 1996b: 74).

The survey, which covered about 90 per cent of derivatives trading worldwide, revealed that those markets are considerably larger than previously estimated. The global notional amount outstanding of over-the-counter (OTC) derivative contracts alone on 31 March 1995 was estimated to be $47.5 trillion among which 61 per cent were interest rate instruments and 37 per cent foreign exchange instruments (Table 3.7).

With respect to foreign exchange transactions the survey comprised traditional forward and swap contracts as well as foreign currency futures and options. In principle, foreign exchange futures are standardised forward contracts traded on an exchange, i.e. contracts to buy or sell a standard quantity of a specific asset—in this case a currency amount—at a pre-determined future date and price with the exchange's clearing house becoming the opposite party to both buyer and seller once a trade has been completed.[6] On the other hand, currency options are contracts sold for a premium that give the buyer the right, but not the obligation, to buy (in case of a call option) or sell (in case of a put option) a specific quantity of a financial instrument at a specified price. Options are traded over-the-counter as well as on organised exchanges.

Table 3.7 Derivatives market activity worldwide*

Category	*OTC contracts*	*Exchange-traded contracts*
Notional amounts outstanding	47,530	8,186
• foreign exchange	17,700	60
• interest rates	28,850	7,835
Gross market values	2,205	
• foreign exchange	1,420	
• interest rates	700	

* Outstandings at end-March 1995 in billions of US dollars.
Source: Bank for International Settlements (1996a: Table II)

Trading in financial futures and options has its roots in the commodities markets and here Japan has a particularly long tradition. Perhaps the first organised exchanges on which forward contracts were traded existed in this country.[7] Today, there are about 70 futures and options exchanges worldwide with still more being developed. Foreign currency futures were the first financial futures contracts which began trading in 1972 on the International Money Market (IMM) at the Chicago Mercantile Exchange (CME). Nowadays, foreign exchange derivatives are traded on ten exchanges in seven countries with the IMM and the Philadelphia Stock Exchange (PHLX) at the top (see also Goldstein *et al*. 1993:31). The instruments available are currency futures as well as currency options and options on currency futures.

In Japan, after a long absence following the end of World War II, several organised markets for financial futures and options were established during the 1980s and in the early 1990s (see Table 3.8). However, with respect to currency instruments, so far there is only one yen/dollar currency future which, since 1989, is traded on the Tokyo International Financial Futures Exchange (TIFFE).

In the 1995 BIS survey, two measures for the size of the derivatives markets were reported: nominal or notional amounts outstanding and gross market values. Notional amounts were defined as the nominal value of all deals concluded and not yet settled at the end of March 1995. They are comparable with measures of market size in related underlying cash markets. Gross market values are defined as 'the costs that would have been incurred if the outstanding contracts had been replaced at market prices prevailing at 31st March 1995' (Bank for

Table 3.8 Markets for new financial instruments in Japan

Date of establishment	*Instrument*	*Exchange*
November 1985	Government-bond futures	Tokyo Stock Exchange
September 1988	Stock-index futures	Tokyo Stock Exchange Osaka Securities Exchange
June 1989	• Stock-index options • Financial futures*	Osaka Securities Exchange Tokyo International Financial Futures Exchange
December 1989	US T-bond futures	Tokyo Stock Exchange
May 1990	Government-bond futures options	Tokyo Stock Exchange
July 1991	Options on euroyen futures	Tokyo International Financial Futures Exchange
July 1992	One-year euroyen interest rate futures	Tokyo International Financial Futures Exchange
February 1994	Nikkei 300 Futures & Options	Osaka Securities Exchange

* 3-month euroyen interest rate futures, 3-month eurodollar interest rate futures and yen/dollar currency futures.
Source: Federation of Bankers Associations of Japan (1994:14)

International Settlements 1996a: 39). The idea behind the latter is, above all, to get information about the scale of price risks in the markets. As the data show, foreign exchange derivatives measured in notional amounts have a much smaller share of the market than interest rate instruments. However, with foreign exchange rates showing much more variation than interest rates, their gross market values—although accounting only for a small portion of their notional amounts—are much higher, hinting at the riskiness of those instruments.

Foreign exchange derivatives trading on organised exchanges worldwide is rather modest. Futures trading is ailing in the shadow of the so much bigger traditional forward exchange market and even currency options play only a minor role compared, for example, to interest rate instruments. This holds particularly for Japan. Here, in marked contrast to the general market growth described earlier, derivatives trading in currencies on organised exchanges shows a rather stagnant development (Table 3.9). This may have several reasons.

In part it is said to reflect an overall risk aversion as a result of Japanese banks' weakness in the aftermath of the speculative wave of the 1980s. However, this would only hold in so far as activities in other comparable markets were low as well which is not the case as the volume of OTC trading in similar instruments shows. More probably, it is the comparative advantages of the OTC markets with their depth and liquidity and their broad range of tailor-made products that count. In addition, regulators' attention in Japan is focusing on the exchanges. From their very beginning, new financial instruments were met with distrust and scepticism by the authorities, and for investors the transparency of exchange trading may be an additional disadvantage in this context.

Over-the-counter trading in foreign exchange derivatives in Japan consists mainly of traditional foreign exchange forwards and swaps (Table 3.10). Their share is more than 77 per cent compared to 66.5 per cent for the global amounts. In the United States, traditional forward and swap transactions account only for about 47 per cent of all foreign exchange derivatives. Currency swaps, which are also in this category,[8] and currency options play a minor

Table 3.9 Derivative financial instruments traded on organised exchanges*

Region	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*
United States	286.2	310.9	301.5	340.1	380.3	509.5
Europe	64.4	83.0	110.5	185.0	263.5	398.5
Japan	45.7	60.6	66.2	51.7	57.8	70.5
Total	420.4	478.3	510.5	635.6	788.0	1,140.2
of which:						
currency futures	27.5	29.7	30.0	31.3	39.0	69.7
currency options	20.7	18.9	22.9	23.4	23.8	21.3

* Annual turnover in millions of contracts.
Source: Bank for International Settlements (1994, 1995)

Table 3.10 Notional amounts outstanding of OTC Contracts*

	Global amounts		*Japan*		*United Kingdom*	*United States*	
Total OTC contracts	40,714	(100)	8,327	(100)	12,220	11,044	(100)
Foreign exchange	13,153	(32)	3,211	(39)	1,429	2,664	(24)
• forwards and swaps	8,742	(21)	2,474	(30)	–	1,264	(11)
• currency swaps	1,974	(5)	540	(7)	822	258	(2)
• options	2,375	(6)	192	(2)	596	1,114	(10)
Interest rates	26,645	(65)	5,100	(61)	10,382	8,147	(74)
• fRAs	4,957	(11)	174	(2)	2,590	874	(8)
• swaps	18,283	(45)	4,516	(54)	6,692	5,558	(50)
• options	3,548	(9)	378	(5)	1,036	1,595	(14)

* In billions of US dollars, in parentheses percentage shares. The figure for the UK does not include foreign exchange outright forwards and swaps outstanding. Global amounts differ from those in Table 4.1 due to adjustments made for estimated gaps in reporting.
Source: Bank of Japan (1996b: Table 2)

role in Japan, although currency swaps which make 7 per cent of all OTC derivatives traded there have a somewhat higher share than globally (5 per cent) or in New York (2 per cent).

Derivatives trading in general, above all in interest rate instruments, has become increasingly popular in Japan in recent years and banks are shifting more and more resources from other businesses to these kinds of activities. On 31 March 1995 the volume of total derivatives trading of the eleven city banks amounted to ¥1,021 billion ($12 billion) which was 2.3 times their combined consolidated assets.[9] In international comparison, where for some institutions the volume is already more than ten times their assets (see Lange and Quast 1995:21), this is still a moderate number. The most active trader was the Fuji Bank with ¥171 billion, followed by the Sumitomo Bank with ¥156 billion, the Mitsubishi Bank with ¥146 billion and the Sakura Bank with ¥114 billion. But other institutions as well as banks engage increasingly in these markets. For example, some time ago, Nikko Securities caught the headlines, disclosing an estimated outstanding notional amount in derivatives trading of ¥4.643 billion or 5.3 times the company's assets (*The Nikkei Weekly* 1995b).

Japanese banks have started to try new ways to gain experience and strengthen their competitiveness in this field due to its rising popularity among customers. Some have founded so-called structured derivative product companies (DPCs).[10] Those companies apply special risk management techniques to get triple-A credit ratings while at the same time trying to minimise their capital. This is typically done by collateralised hedging transactions (mirror transactions) with the parent or an affiliated company. The idea behind this is that there are customers concerned about the credit risk in the derivatives markets—for example, eurobond issuers such as

sovereigns and multinational agencies—that would insist on dealing only with the most highly rated intermediaries.

Structured DPCs have existed since 1991. Among the nine firms currently operating around the world are two Japanese ones, Tokai Derivatives Products and Sumitomo Bank Capital Markets Derivative Products. There were other variants of derivative product companies in operation before, which received their high credit ratings not by their risk management approach but in other ways, either by maintaining enough capital to absorb nearly any risk they might take, or by virtue of their parents' rating. For example, the latter is the case with the only DPC a big Japanese non-bank institution is involved in so far, Goldman Sachs Mitsui Marine Derivatives Products.

One Japanese bank, the Dai-Ichi Kangyo Bank, has taken another path and chosen a form of cooperation instead to win customers in the derivatives business. It has a special agreement with Merill Lynch to use Merrill Lynch Derivative Products as a counterparty on swaps it arranges for clients (see Urry 1996). Since the Dai-Ichi Kangyo Banks own rating had been downgraded due to its high share of non-performing loans after the breakdown of the speculative wave of the 1980s, it had found it increasingly difficult to conduct derivatives trading with big clients. For the bank, the cooperative solution was the less costly alternative to raising capital to establish its own derivatives subsidiary.

These and other innovative approaches in business practices cannot hide the fact that in Japan, at least in foreign exchange trading, new financial instruments such as futures and options are of minor importance so far. Derivatives trading here means, above all, trading in traditional over-the-counter instruments, i.e. forward foreign exchange transactions and swaps. In particular, the swap market has a much larger weight than in other centres. With regard to the discussions about market risks, financial stability and the regulation of derivatives trading in recent years this observation leads directly to the question of risk awareness and risk management in the Japanese market.

4

ATTITUDES TOWARDS RISKS

In one way or the other, most foreign exchange transactions are depending on, and reacting to, the risk of future exchange rate changes. This does not only hold for capital flows and portfolio investments. Even an exporter who receives a fixed amount in foreign currency he wants to change, or an importer needing to buy foreign currency to pay his bills, normally has some scope for at least leading or lagging the payment and chosing a favourable moment for the trade. Basically, there are three ways to deal with foreign exchange risk: to take it, to hedge it or deliberately to assume it. Doing nothing is not a risk-free alternative but simply another way of risk taking. In order to judge properly the behaviour of Japanese firms, in the following sections, a short introduction to some basic concepts will be given at the beginning before turning in detail to the actual strategies adopted.

COVERING AND HEDGING

Generally, for a company, there are many possible strategies to avoid or limit foreign exchange risk depending on the kind of activities pursued and the nature of the positions exposed to that risk. Traditionally, three measures of exposure are distinguished: transaction exposure, translation or accounting exposure and economic exposure.[1] In short, the first concept describes the actual transactions that will foreseeably take place in foreign currencies. The second approach is broader. It deals with the valuation of a company's assets in foreign countries. The third one is the widest and is defined as the impact of exchange rate changes on a firms discounted cash flow at a specified future date.

The most simple case is the transaction exposure which always involves an identifiable cash flow requiring an exchange transaction at maturity. Trade payments, short-term investments in foreign currency, interest payments on foreign assets or dividend remittances from a subsidiary in a foreign country to the parent are examples of these kinds of flows. In principle, in these and similar cases, a full protection against foreign exchange risk is possible. Ideally, the currency, amount and maturity of the exposure are perfectly known and

the position can be closed by establishing a matching position of opposite sign but equal amount and maturity in the same currency in the foreign exchange market. A Japanese exporter expecting to receive a dollar payment in three months can sell the respective amount in advance in the forward market. At maturity, he will settle the forward transaction with the payment received at the rate agreed three months ago. By this means he has 'locked in' his price in yen and is no longer exposed to risk.[2] This kind of transaction is called covering. It needs to be stressed that *covering* always involves self-liquidating transactions.

Covering can protect a given open position but it does not solve all problems related to exchange rate changes. In the long run, if an unfavourable currency movement goes on and new contracts have to be negotiated, prices most likely will adjust in one way or the other and losses occur. Japanese exporters have had particularly painful experiences in this direction. During two lasting periods of yen appreciation, from 1985 to 1987 and again in the first half of the 1990s, their international price competitiveness seemed seriously endangered several times.[3]

One way to cope with this kind of effect is to gradually change the currency denomination of contracts shifting to a larger share of payments made or received in home currency. During the early 1990s, the Japanese Ministry of International Trade and Industry, repeatedly urged Japanese companies to revise their attitude in this respect—without much success. The share of exports denominated in yen has remained more or less unchanged over the years (Katsu 1995:29).

The reasons for this are manifold. Above all, the currency denomination in international trade is a question of market power, and obviously to maintain their competitiveness Japanese firms do not want, or cannot afford, to enforce yen contracts on a larger scale. On the other hand, many exports of Japanese companies go to their own subsidiaries overseas and in this case a yen denomination would only shift the currency risk from the parent to the offspring.

Positions that can be covered impose no real problems to firms. Whenever Japanese enterprises reported currency losses in recent years those either stemmed from the deliberate decision to leave the positions unprotected or from other activities. And losses they did have, sometimes resulting from very long-term commitments and sometimes on a massive scale. For example, at the end of 1994 the Japanese airline, JAL, reported losses totalling ¥176.3 billion ($1.7 billion) from 1985 foreign currency contracts (Dawkins 1994c). At the same time the Ministry of Posts and Telecommunications disclosed that both the national postal life insurance organisation and the postal savings system together had losses of more than ¥1.3 billion on foreign bond holdings (Webb 1995). Between 1985 and 1987, the first yen appreciation cost Japans life insurance companies around ¥4.6 trillion which they compensated for by sales of securities holdings (Terazono 1994).

As a rule, those and other losses are related to translation or economic exposures. Expecting—or pretending to expect—losses on net exposure positions of business operations that are reflected in the balance sheet, or even on a firm's present value, due to exchange rate changes, companies enter forward,

futures or options contracts to match the position and establish a zero net exposure. Those strategies which are called *hedging* differ from covering in that they do not automatically involve a self-liquidating transaction.[4] If the hedge works a cash inflow resulting from a foreign currency gain is, in parts, wholly or even over-compensating an originally expected loss either in the form of a cash outflow or in book value. However, sometimes expectations are not fulfilled and while, in many cases, the gain or loss on the valuation of the initial exposure is just on the books a loss on the compensating foreign exchange position always generates a real cash flow which the firm has to pay.

At the end of the Fiscal Year 1994/95 there were ample reports of such kinds of losses when for the first time Japanese companies listed on the stock exchange or over-the-counter market became obliged to disclose unrealised profits or losses from forward contracts to buy or sell foreign currency for yen (see Dawkins 1994b). It turned out that the sectors that had been hit most by the subsequent yen appreciations were those needing foreign currency to buy assets or materials such as oil refiners, petrochemical groups, general trading companies and airlines. Showa Shell Sekiyu which reported a ¥165 billion unrealised foreign exchange loss in February 1993 and Kashima Oil, a medium-scale oil refiner, which disclosed a loss of ¥152.2 billion in April the same year, gained a doubtful reputation in this respect. When in August 1994 *Euromoney* published a list of famous losses in world financial markets those two companies were at the top (see Table 4.1).

In the case of Showa Shell, it was the rolling over of forward positions that was said to be the main reason why foreign exchange losses went out of control. The motive can be found in accounting rules that until 1994 enabled firms to hide unrealised losses by reporting those trades at historic values.[5] In

Table 4.1 Famous financial losses*

Company	*Instrument*	*Amount*
Between 1984 and 1994:		
Klöckner	Commodities futures	380
Merill Lynch	Principal only mortgage-backed securities	335
Allied Lyons	Currency options	275
Volkswagen	Foreign exchange futures	260
Nippon Steel	Foreign exchange derivatives	130
In 1993/94:		
Showa Shell Sekiyu	Foreign exchange forwards	1,580
Kashima Oil	Currency derivatives	1,450
Metallgesellschaft	Energy derivatives	1,340
Codelco, Chile	Commodities futures	200
Procter&Gamble	Leveraged D-mark/US dollar spread	157

* In millions of US dollars.
Source: Shirreff (1994:29)

1989, Showa Shell had started to buy dollars forward at an average cost of ¥145. When the yen/dollar rate fell it rolled over its position to postpone settlement which inevitably would have revealed the losses.

Until April 1994, when the Ministry of Finance changed the rules, the rolling over of forward positions was common practice in Japan.[6] Normally, to roll over means to prolong a position by a swap consisting either of a combined spot and forward trade or two forwards of different maturity. In case of a dollar long position (the dollars were bought forward originally) the firm would sell the dollars spot or for the near future, thereby closing the initial position, and at the same time buy them back for another more distant date re-establishing the exposure. In principle, this could continue indefinitely if it were not for the rollover costs which can become prohibitively high.

The pitfalls of rollovers became obvious when, at the end of 1994, the German conglomerate Metallgesellschaft nearly collapsed after its US subsidiary announced losses of DM2.8 billion from unauthorised oil exposures which were part of a strategy to hedge long-term delivery contracts with short-term futures that were constantly rolled over. A rescue operation of the parent to unwind the positions was hotly debated after Merton Miller, a nobel laureate and professor at Chicago University, wrote a paper arguing that Metallgesellschaft had mis-understood the hedging strategy and liquidated the positions prematurely thereby unnecessarily giving up value.[7]

In the foreign exchange markets, the decision whether a long-term position is hedged by a transaction of equal time span or divided into contracts for smaller subperiods should, in principle, make no difference as long as the hedge is not interrupted. Depending on the direction in which the exchange rate moves, for each contract period, there is either a loss in the initial position combined with a gain from the hedge contract, or vice versa, and in the end, cumulated gains and losses from the short-term hedges and hedged positions would cancel out each other showing the same result as a once-and-for-all strategy.

Short-term contracts give the firms more flexibility which, for example, may become important when expectations about the future direction of exchange rate changes are very uncertain. In this case, if circumstances change it is easier to stop the hedge by simply doing nothing than to unwind an existing long-term position. But, there are clear disadvantages, too, as a small example may illustrate.

Assume a firm has bought dollars for yen at a rate of ¥140/$ for three months to hedge a longer-term position on a rollover basis. When after the first three months the dollar has risen, for example to ¥150/$, the firm faces a book loss on its dollar liabilities which, depending on the hedge strategy, is partly or wholly compensated by a foreign exchange gain from selling the dollars it received from the forward trade spot. The spot trade is part of a swap to roll over the initial hedge position. The second leg of the swap is a new three-month dollar purchase.

The situation would look slightly different had the dollar declined, say to ¥130/$, after the first three months. In that case, the firm would report a gain on its dollar liabilities in the books, but in the foreign exchange market it would face a loss because it would have to pay ¥140/$ for the dollars it received from the initial forward contract but only get ¥1307$ selling them spot. In rollover hedges, the question is how many situations like this can a company afford. After a while, if the yen appreciation continues, it may run short of liquidity. Depending on the financial instruments used margin calls from the futures and options exchanges may pile up and swap counterparties in the OTC market may demand collateral. In this case, credit and funding risks add to rollover risks, i.e. the risks of contract renewal and additional cash needs, and eventually, in the worst case, the firm cannot help but abandon the hedge prematurely and at high costs.

Evaluating the motives and logic behind a hedge strategy is extremely difficult from outside. On the one hand, the relation between the original position and the hedge can be very loose and, on the other hand, a firm would normally not admit building up a speculative position if it intended to do so. For example, to judge a comparatively simple strategy as an alleged hedge of an inventory of goods which were produced and reported at historical costs but not yet sold would require at least knowing the final country of destination of those goods and the contract currency. But, very often the situation is complicated by the fact that the company in question has a wide range of activities in several countries and assets and liabilities in more than one currency. What if the currency earned with the sales is not intended to be changed into the home currency but to be used to buy materials, or changed into a third currency for that purpose? What if the currency needed for the hedge is not available? What if there were other positions of opposite sign in the same currency but for another maturity, or in a third currency but for the same maturity? In which cases would a netting of positions be justified?

Similar problems arise for other balance-sheet items, too, and the picture becomes even more confusing when a company's economic exposure, i.e. its discounted present value, is to be hedged. This would include, among other things, taking into account price and income elasticities in various markets as well as the sensitivity of cost components to exchange rate changes and many more, with the result that the relation between net exposure and hedge would become even harder to judge. Thus, in principle, without knowing a firm's long-term objectives and intentions it is impossible to tell about the true motives behind its currency strategies. How broad a company's scope is in this respect became apparent in July 1995 when observers tried to forecast Sony's first-quarter results days before they were published. Estimates ranged from ¥16.5 billion to ¥26 billion with the width reflecting different views over how the Japanese consumer electronics manufacturer would handle non-operating losses on its foreign currency holdings (*The Financial Times* 1996e).

POSITION TAKING AND ARBITRAGE

Not all book values in foreign currency or future transactions involving the transition from one currency to another are hedged in the foreign exchange market. Many actors prefer taking risks by leaving, or deliberately establishing, open positions. The best example of this attitude is Japanese institutional investors. In the first half of the 1980s, when Japan's current account surplus began to grow, trillions of yen of savings accumulated with those institutions and the only markets big enough to digest those amounts were those for foreign bonds, above all the eurodollar market and the market for US treasury bonds. Life insurance companies and pension funds started to purchase dollar-denominated bonds on a large scale and they continued to buy even when the value of the dollar against the yen declined massively. For example, in 1986, when the dollar fell by 21 per cent, Japan's institutional investors still increased their dollar bond holdings by 75 per cent to $61 billion (see *The Economist* 1987a).

There were several reasons given for this phenomenon.[8] The first is a lack of domestic investment opportunities. Due to an economic recession in those years, the demand for funds in Japan was sluggish and companies' investment in plant and machinery low. On the other hand, institutions were encouraged to invest abroad by the Ministry of Finance which raised the ceilings on the proportion of foreign assets they could hold to boost capital outflows and dampen the yen's rise against the dollar. And, long-term interest rates in the United States were much higher than in Japan. For example, in March 1985, the interest differential was 4.86 percentage points. In particular, insurance companies were looking for high-yielding investments because under Japanese law they could only redistribute interest income, not capital gains. But, the high interest rates also had another advantage. When at last they fell, investors profited from price increases by selling the bonds.

All this does not provide an adequate explanation for why the institutional investors seemingly did not care about the fall of the dollar. The reason for this is found in official regulation. In March 1986, accounting rules in Japan were changed giving insurance firms the option to revalue their foreign bonds which opened a way for them to book foreign currency losses to set against tax. This was particularly attractive to them because they were not obliged to book the subsequent currency gains should the dollar rate start to rise again. This rule, plus the interest differential and the gains from rising bond prices were said to more than offset the foreign exchange losses.

Investors that did not benefit from the change in accounting rules, such as commercial banks and companies, appeared well aware of the foreign exchange risk. They were said, at least in part, to adopt a variety of strategies to protect themselves against currency losses. A large share of their foreign investments in those years was funded either from dollar revenue or short-term dollar borrowings and, at least temporarily, some part was also hedged depending on exchange rate expectations.

In the first half of the 1990s, the picture looked completely different. Japans institutional investors reacted to the second yen appreciation by drastically reducing their share of foreign assets. It decreased from 15 per cent in 1989 to 8.3 per cent in 1993 (Table 4.2). Several influences had come together to cause this change in attitudes.[9]

Above all, after the breakdown of the speculative wave in the stock market, Japanese investors suffered a sharp fall in unrealised profits on their stock holdings which made them more aware of the losses they experienced in other areas as well and more risk averse than in earlier years. In addition, a decline in foreign interest rates and a narrowing interest differential further reduced the attractiveness of foreign investments. Suddenly, they felt the share of foreign securities in their portfolios was much too high. It was only in 1993 that they returned to the international markets on a larger scale and even then they shunned currency risk. Their demand concentrated on yen-denominated securities which was regarded as the main explanation for the yen being the most widely used currency in the international securities markets for the years to come (Bank for International Settlements 1996b: 149).

Neglecting currency risk in the way Japanese institutional investors did in the 1980s is rather unusual. Although highly speculative by nature it is also in strong contrast, for example, to active position taking in which market participants search for profits from exchange rate changes with a minimum of capital. The possibilities in this respect differ depending on the amounts traded as well as a firm's strength and market access.[10]

As a rule, companies such as the Japanese insurers that do not directly participate in the market would prefer forward contracts to establish an open foreign exchange position because this would relieve them at acceptable costs from unnecessarily binding liquidity. At least part of the reported activities of Japanese firms experiencing large currency losses in recent years probably fall in this category. The firms buy forward the currency which they expect to

Table 4.2 Life insurance companies' foreign securities[a]

	Foreign securities holdings		
Year	*in billions of yen*	*as % of total assets*	*Unrealised profits on stock holdings*[b]
1988	13,747	14.0	45,000
1989	17,988	15.3	34,000
1990	17,199	13.1	25,000
1991	17,608	12.3	9,900
1992	16,892	10.8	9,900
1993	14,047	8.3	12,500

a Total of top 30 companies.
b Total of top 18 companies, in billions of yen.
Source: Terazono (1994)

appreciate in the hope that at maturity they can sell the amount at a higher than the agreed rate in the spot market. Due to market practices, in this case, they need no cash because they can settle the forward trade at the same time as the spot transaction getting paid only the difference between spot and forward. If their expectations are not fulfilled they have to pay the difference. On the other hand, if they do not wish to close the position at maturity they can roll it over, i.e. prolong it by a swap. With the spot leg of the swap they sell the forward amount received, with the forward leg they re-establish an open position of equal amount and currency for a more distant date.

In contrast, banks and other participants with direct market access normally turn to the spot and swap markets for active position taking. As direct market participants the banks do not have the liquidity problem their clients would face in this case. When they buy a currency in the interbank market, hold it for a short time during the day or overnight, and then sell it again, due to established customs comparable to that of a forward trade, it is only the difference, i.e. the resulting gain or loss, that has to be paid which guarantees a high degree of flexibility.

Nowadays, arbitrage makes up the bulk of banks' activities. Among other things, this is the main reason for the large share of swaps worldwide. Traditionally, arbitrage is defined as a strategy to take advantage of differentials in the price of a currency in different markets. A dealer buys a currency at a low rate from one counterparty and, at the same time, sells it at a higher rate to another without ever being exposed to currency risk. In today's internationally highly interdependent and information efficient markets those occasions have become rare and arbitrage rather means the exploitation of price differences in time. Dealers buy a currency spot in the hope to sell it later in the day at a higher rate, or they sell a currency which they expect to buy back later at a lower rate. Since, in this case, albeit for a short time, they establish an open position, they are exposed to currency risk, and the frontiers between speculation and risk-free profit making from arbitrage in the traditional sense become blurred.

The way in which those strategies work highlights the reasons why they are reserved to direct participants in the market. Open positions are established only for hours or even minutes and gains are sought from the slightest rate movements. To exploit minimal profits fast reactions are needed as well as closeness to the market. For a firm or an individual to call a bank or a broker in such a situation would not only mean to lose time but also involve costs which could easily eat up the tiny margins.

Spot arbitrage is not limited to a day or two. If expectations do not come true in time, or if prospects continue to look promising, there is always the possibility of prolonging the position either by a swap or by a respective money market transaction to the next business day or any other short-term date. Again, no liquidity is needed. For example, with a tomorrow/next, or tom/next, swap a dealer who bought dollars spot can close the position after one business day selling the dollars with the short leg of the swap, which is one day, and establishing another open position with the long leg buying

the dollars back in two days. This is one explanation for the rule that the larger the spot market the larger the share of swaps in a market.

However, direct market participants do not only profit from very short-term absolute exchange rate changes, they also exploit the smallest variations in the swap rate or interest rate differential.[11] In principle, this strategy involves a combination of forward contracts of different maturities. Again, both trades are executed as swaps with the respective spot legs compensating each other. If, for example, the US interest rate for a given period is higher than the Japanese one and, at the same time the forward discount for the US dollar for two months is higher than for one month (the interest differential for two months is higher than for one month) a bank expecting a fall, or at least no rise, in the interest differential for the next two months may profit from buying dollars for two months and at the same time selling the dollars first for one month and then for another one (see Figure 4.1).

During the first month, there is no currency risk. Currency and amount for the dollar short and long position are the same. But, this does not hold for the second month, because the bank does not know in advance the conditions it will get for the second one-month trade. If its expectations come true and the interest differential does not change it will make a loss from the trade after the first month when it has to buy the dollars spot at a higher rate than the agreed forward rate for one month to settle that trade. But, the loss will be more than compensated when after the second month the bank gets the dollars from the two-month trade at a low rate selling them at a higher rate to fulfil the second one-month trade.[12] Figure 4.1 demonstrates such a successful outcome under the assumption of a constant spot rate and a constant interest differential for one month.

By these and other techniques, banks worldwide manage to profit from exchange rate changes, even in times when other market participants experience currency losses. The results of the big Japanese banks in the early 1990s show that they are no exception in this respect (Table 4.3). They also demonstrate once again the remnants of specialisation among Japanese institutions in this field with the Bank of Tokyo having by far the highest gains which in 1992 amounted to more than ¥72 billion, followed by Sumitomo Bank with about ¥38.6 billion and Fuji Bank with around ¥35 billion. However, they show considerable variations as well with changes in gains from one year to another ranging from over minus 34 per cent to plus 5.5 per cent.

TRADING TECHNIQUES

The success or failure in foreign exchange trading, be it for position taking, hedging or other purposes, depends to a large extent on the ways in which expectations of future exchange rate changes are formed, what kind of information is used and how the information is processed. In principle, two broad categories of market participants are commonly distinguished,

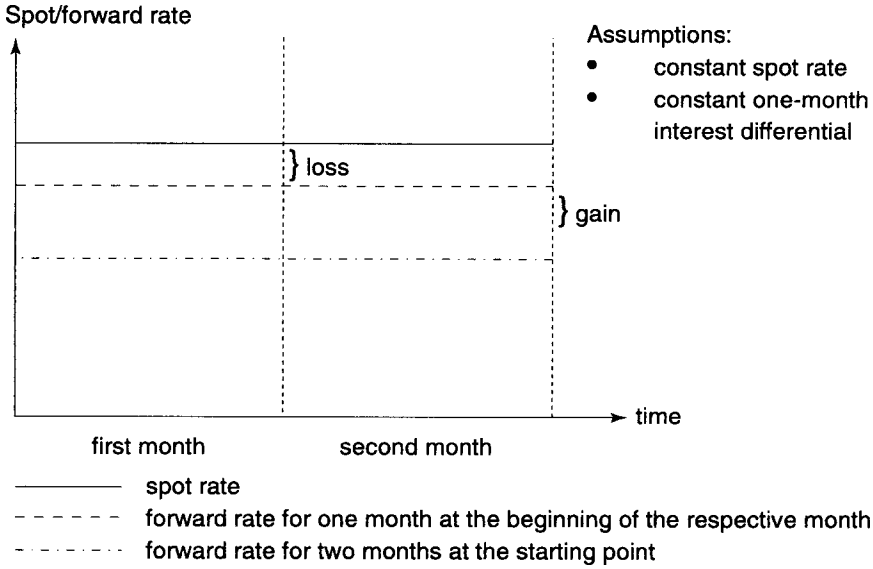


Figure 4.1 Successful swap-rate arbitrage

fundamentalists and chartists. The main difference between both groups is that while chartists get their information solely from studying the past history of prices, fundamentalists try to look at the reasons behind those developments.[13] Above all, fundamentalists' expectations of future currency movements are founded on basic economic relations which are thought to affect the exchange rate in one way or the other. They are strongly influenced by leading economic theories of exchange rate determination.

The most commonly accepted fundamental relation assumed to hold is purchasing power parity which is an equilibrium condition for the goods markets in many economic models. It says that in the long run the exchange rate of two currencies is determined by the relative price of goods in the two countries. There is an absolute version referring to the difference in price levels which states that a currency is overvalued if the price for a product, or a range of comparable products, in the respective country is higher than in the other one. In contrast, the relative version says that it is overvalued if prices in that country have risen faster than elsewhere.[14]

There are many other fundamentalist theories, stressing the importance of either goods or asset markets, the balance-of-payments' current account or capital account, or the interplay of both. As a rule, fundamentalists do not cling to one view or the other but follow a rather eclectic approach. Accordingly, the influences they consider are as diverse as relative prices and interest rates, demand and supply elasticities, economic growth, productivity, investment, consumption and savings rates, the effects of monetary and fiscal policy and a whole range of factors affecting the countries' international

Table 4.3 Japanese banks' foreign exchange profits[a]

Bank	*Fiscal Year 1993*[b]	*Fiscal Year 1992*[c]	*Percentage change*
Bank of Tokyo	56,044	72,872	–23.1
Dai-Ichi Kangyo	18,093	21,610	–16.3
Sumitomo	40,552	38,668	4.9
Fuji	23,138	35,205	–34.3
Sakura	21,595	24,807	–12.9
Sanwa	22,041	26,519	–16.9
Mitsubishi	18,332	27,510	–33.4
Daiwa	10,022	9,499	5.5
Tokai	17,085	22,665	–24.6
Asahi	7,924	7,729	2.5
Hokkaido Tokushoku	3,115	3,449	–9.4
Total	237,931	290,533	–18.1

a In millions of yen.
b Ending 31 March 1994.
c Ending 31 March 1993.
Source: Yu (1994:24)

competitiveness. In addition, they take into account political and social events, natural disasters and all kinds of rumours reaching them in the course of the day.

Chartists do not bother to look at all those 'facts'. They do not search for an explanation why past exchange rates behaved in a certain way but whether their history exhibits systematic patterns which can be exploited for future trades either by visually identifying recurring movements or by applying technical trading rules. The assumption behind this approach is that it is not necessary to consider the determinants of exchange rate changes because the prevailing rate itself contains all relevant information available with markets immediately discounting any new developments.[15]

The concentration on historical prices does not mean that chartists are a homogenous group. On the contrary, as emphasised by market observers, chart analysis has a large subjective element (compare Allen and Taylor 1990:50). Chartists apply a wide variety of techniques often combining graphs with other statistical tools. Some of the mechanical indicators they use are trend-following like, for example, the combination of moving averages of different length. Others aim at signalling when a market is 'overbought' or 'oversold' showing signs of a coming 'correction'. Filter rules are an example. The purpose of a filter is to eliminate trades with a lower probability of success. An x per cent filter rule, for example, signals that a currency should be bought if it has risen x per cent from its most recent low point and sold if it has fallen x per cent from the highest level since the position was opened.[16]

Charts and technical analyses[17] in general have their roots in the commodities markets. It is only with the beginning of trading in financial futures and other

exchange-traded derivatives in the 1970s that those techniques became more widely used in currency markets as well. The most common type of price charts are bar charts[18] an example of which is shown in the left half of Figure 4.2. In a bar chart, each day is represented by a vertical line connecting the daily low and high of prices. The horizontal line to the right of the vertical line is the closing price. Often, there is an additional horizontal line drawn to the left which then shows the opening price.[19]

By visual inspection of bar charts investors try to identify recurring patterns in currency movements for which sometimes they have characteristic names. They look for trends as well as channels and trading ranges showing the limits to exchange rate fluctuations for an extended period. They consider so-called support and resistance levels, analyse continuation patterns such as flags and pennants or triangles which are thought to hint at congestion phases within longterm trends, or study top and bottom formations as indicators of a potential trend reversal.

There is a special Japanese technique of chart analysis which resembles the bar chart in many ways and which is not only used in Japan. Figure 4.2 shows an example of the Japanese candlestick chart[20] in comparison to a bar chart. In a candlestick chart *(rosoku ashi),*[21] the line for each day consists of a thick part and thin lines above and below. The thick part is called the main body *(jittai)* representing the range between the day's opening price *(hajimene)* and closing price *(owarine)*. A black real body means that the closing price was lower than the opening price *(insen),* a white one that the close was higher *(yosen)*. The thin lines, called the shadows *(kage),* show the day's

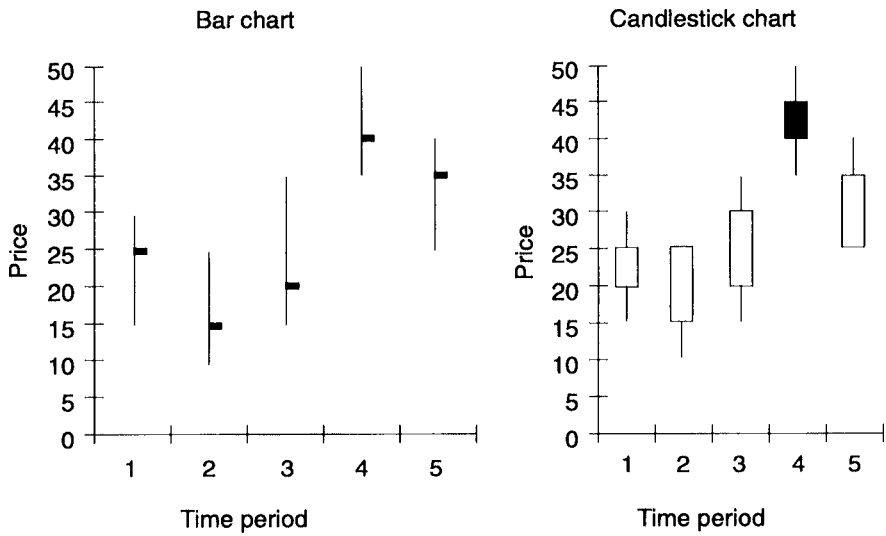


Figure 4.2 Bar chart and candlestick chart

extremes with the peak of the upper shadow *(uwakage)* representing the high *(takane)* and the bottom of the lower shadow *(shitakage)* being the low *(yasune)*. If a candlestick has no upper or lower shadow it is said to have a bold *(marubozu)* head or bottom meaning that the high or low lies within the range between the opening and closing price.

The origins of candlestick charts date back to the eighteenth century and to a technique known as 'Sakata's Rules'. Sakata was a port city in Japan where in 1750 a merchant from a wealthy family, Munehisa Honma, established a local rice exchange. When his father died he became responsible for the family's wealth. He went to the Dojima Rice Exchange in Osaka, began trading in rice futures and became fabulously rich. The family grew rice and Honma kept records of yearly weather conditions. He analysed past rice prices and had his own communications system to be kept informed, with men placed on rooftops with flags over the whole distance from Osaka to Sakata. He wrote books about the markets and when he died in 1803, he left the world, among other things, a trading technique based on price histories which evolved into today's candlestick method.

Similar to bar chart analysts, investors using candlestick charts look for recurring patterns for which they have special names. For example, in some of them candlesticks called 'hammer' and 'hanging man' play a decisive role. There are reversal patterns like the Western top and bottom formations which are called 'three Buddha patterns' as well as indicators for a trend continuation such as the 'shooting star', a bearish signal in an upwards trend, or the *'tasuki* gaps'[22] which work in both directions, and many more.[23] 'Sakata's five methods' consist of the 'three mountains' *(sanzan),* 'three rivers' *(sansen),* 'three gaps' *(sanku),* 'three parallel lines' *(sanpei)* and 'three methods' *(sanpo)* which are devices that show how to interpret different price formations (see in detail Shimizu 1986, 108–32).

In foreign exchange markets, both fundamental and technical analyses are often used side by side. According to a study on behalf of the Bank of England, about 90 per cent of chief foreign exchange dealers in London place at least some weight on technical analyses (Allen and Taylor 1992:304). Nevertheless, sometimes clear preferences seem to exist depending, among other things, on market participants' motives, their flexibility and time horizon. For example, banks and big firms with direct market access have the means as well as an incentive to try to exploit even the smallest exchange rate changes from day to day or within hours.They attach relatively large weight to technical or chart analyses. At the other end of the spectrum is the small exporter or importer with limited market access, who is not frequently trading in currencies, who faces considerable liquidity and budget constraints, and has only a narrow range of currency instruments for hedging and speculation purposes available. He concentrates on fundamentals, with the reports of main economic and political developments in the media often providing the only source of accessible and affordable information.

As a rule, for the big foreign exchange dealers, the shorter the time horizon, the greater the influence of technical analyses on trading decisions. Fundamentals change comparably slowly, requiring a relatively long period of time to get a clear picture, so that dealers must also focus their attention on technical tools for clues about future exchange rate changes. However, there is one exception to the rule.

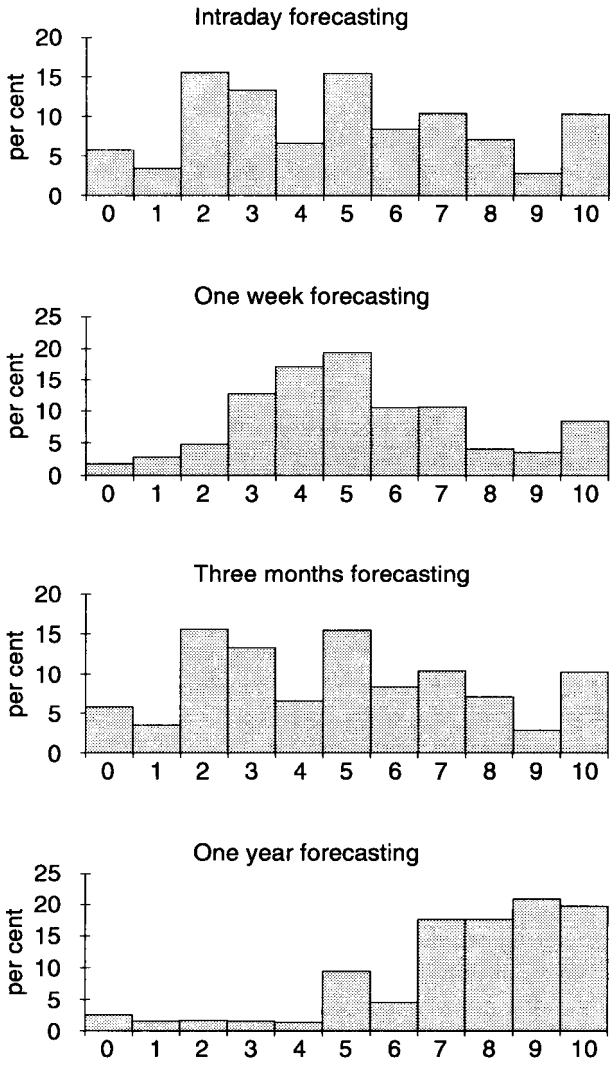
According to the Bank of England study, in intra-day trading, both techniques appear more or less equally distributed (see Figure 4.3). The reason probably lies in the comparably large weight all kinds of news have in the markets in the very short run. For example, research on the impact of economic news announcements on foreign exchange futures markets found that the major price adjustment takes place within the first minute after the announcement, with volatility remaining higher than on average for about fifteen minutes more and slight aftershocks still occurring during the next hours (see Ederington and Lee 1993).

The Bank of England study also shows that for one-week forecasts, technical analyses play a decisive role. More than 60 per cent of respondents regard charts as at least as important as fundamentals for forming exchange rate expectations. For a three-month horizon the weight given to fundamentals in forecasts increases strongly and for one year over 80 per cent of the dealers judge them to be more important for their decisions than charts.[24]

There are no similar data for the Tokyo foreign exchange market but there are some indications that the weight of charts and technical influences is probably even stronger in this place. On the one hand, there is the dominant role banks play in this market. As has been argued, banks' activities—in contrast to those of most non-bank institutions—can be considered to consist to a large part of short-term position taking which is very often based on chart trading. On the other hand, there is the share of derivatives, i.e. of instruments with a long tradition of technical analysis, which in Japan is relatively high in international comparison. If it is true that the more bank activities in a market, the more shortterm maturities and the more derivatives trading, the higher the weight put on technical analyses, then probably in Tokyo those techniques are of particular importance.

ACCOUNTING

As has become apparent earlier on various occasions, one aspect which is crucial in determining attitudes towards risk in foreign exchange markets is accounting principles and accounting procedures. In this respect, Japan has seen remarkable changes in recent years. The beginnings of accounting in this country go back to 1865 when a French naval accountant introduced double-entry bookkeeping at the Yokosuka Steel Works.[25] The next year the chronicle mentions is 1871 when one V.E.Braga was employed as a chief accountant at the mint in Osaka. In 1875 a Western teacher of accounting,



Scale: 0 = pure chartism to 10 = pure fundamental analysis.

Source: Allen and Taylor (1992: Table 3).

Figure 4.3 Charts versus fundamentals

W.G.Whitney, was engaged at the first commercial college that later became Hitotsubashi University. In 1873, the founder of Keio University, Yukichi Fukuzawa, published the first book in Japanese on Western bookkeeping.[26] The first group of Japanese professional accountants organised themselves in 1907 (Cooke and Kikuya 1992:97). Japan has become famous for the 'opacity of its accounting practices'.[27] Critics refer above all to the treatment of unrealised gains and losses which, on the one hand, are widely seen to be responsible for the extent of *zaitech* activities of Japanese banks and non-banks, and, on the other, considered to be one reason why the breakdown of land and asset prices at the end of the speculative bubble of the 1980s hit Japanese firms so hard.[28] Another argument often heard is that 'in Japan it is relatively easy for firms to hide or generate profits or to undertake other balance sheet manipulations by using subsidiaries' (Kuroda *et al.* 1994:67). This refers to the fact that Japanese financial statements are normally prepared on a non-consolidated basis. Although consolidated financial statements are required for listed companies since April 1977, there is a clause excluding 'non-material' subsidiaries, a formulation which has met severe criticism from outside due to the subjectivity involved (Cooke and Kikuya 1992:208).

In general, the Japanese accounting system is based on three different legal structures given by the Commercial Code, the Securities and Exchange Law and various tax laws. Accounting standards set by the three are closely tied and interrelated which is the reason why the whole is sometimes called a 'Triangular System'. In addition, Japanese banks are regulated by the Bank Act, whose articles have priority over those of the Commercial Code.[29] Under the Bank Act, accounting requirements for banks are set by notification from the Banking Bureau of the Ministry of Finance on the same basis as the Japanese Generally Accepted Accounting Principles (GAAP).

There are several institutions which influence Japan's financial reporting system in one way or the other. The Business Accounting Deliberation Council (BADC), an advisory body to the Ministry of Finance, is solely responsible for issuing accounting standards and recommendations which are mandatory, having the authority of ministerial ordinances.[30] The BADC consists of technical staff from business, universities and professional accountants as well as from the Ministry itself. Its forerunner was the Investigation Committee on Business Accounting Systems (ICBAS) which was established under Allied Occupation in 1948 in reaction to the then prevailing lack of detail, and variety of practices, in Japanese accounting.

Another institution exerting considerable influence is the Japanese Institute of Certified Public Accountants (JICPA). Although the JICPA has no authority to issue accounting standards, it exercises administrative guidance in the form of statements and opinions and establishes rules to uphold professional standards and develop the profession. Those rules must be strictly observed by its members.[31]

Together with the Ministry of Finance, the Ministry of Justice, the Tax Bureau[32] and various groups of lobbyists such as the Keidanren, the Nikkeiren, the Keizai Doyukai and the Japan Chamber of Commerce and Industry, to name the most important ones,[33] these institutions nowadays are strongly involved in discussions, consultations and preparations to change the accounting standards for Japan's business community. So far, the Japanese GAAP are generally based on historical cost accounting allowing only partially for the lower of cost or market. According to the Bank Accounting Standards for securities valuation, as far as they concern their investment accounts, banks can choose between both principles for exchange-listed securities, excluding shares of subsidiaries, while for others the lower of cost or market principle applies. With respect to the banks' trading accounts all exchange-listed securities without exemption have to be valued at the lower of cost or market, for all others both approaches are possible (Table 4.4).

The problem with historical cost accounting is the resulting disparities in book and market values which is widely recognised (Kuroda *et al.* 1994:42–4, Suto 1996:28). In Japan, land and stock prices rose sharply during the speculative wave of the 1980s and although there has been some market correction afterwards companies valuing the assets at purchasing prices and not at replacement costs still carry huge amounts of unrealised profits which do not appear on the books. This has several advantages for them. On the one hand, it enables them to raise profit levels through the realisation of hidden profits. On the other hand, it helps to veil losses by adjusting prices through back-to-back securities transactions.[34] As a result, for creditors as wells as shareholders and investors it is impossible to accurately judge a company's strength and performance. This has led to the possibility of introducing market value accounting at least for some types of assets and liabilities.

Besides, much of the discussion centres on the treatment of off-balance-sheet transactions, and here in particular of derivatives,[35] for both banks and

Table 4.4 Banks' securities valuation standards

Securities	*Category*	*Valuation standard*
On trading accounts	Exchange-listed	Lower of cost or market
	Others	Historical cost, or lower of cost or market
On investment accounts	Exchange-listed, excluding shares of subsidiaries:	
	• government bonds and other bonds	Historical cost, or lower of cost or market
	• other securities	Lower of cost or market
	Shares of subsidiaries	Historical cost
	All other securities	Historical cost

Source: Kuroda *et al.* (1994: Table 2)

non-banks. Derivatives differ from other financial instruments in that they are highly leveraged. This means that in these cases the investor effectively has a position in the asset underlying the contract with very little own money needed. As a result, the exposures are particularly sensitive to price changes containing the chance of huge profits as well as big losses. This holds especially for options contracts since their market value depends in a non-linear way on a variety of influences. With the increasing volume of derivatives trading in recent years there was a growing need for information about the extent of investors' exposure to market risk, in Japan as well as worldwide, which existing standards did not or not sufficiently meet.

Generally, accounting standards for derivatives in Japan differ considerably for banks and non-financial companies depending on the kind of instrument (see Table 4.5). Unified standards exist only for banks' foreign exchange positions which fall under the Revised Foreign Exchange Accounting Standard introduced in 1990,[36] and even these exhibit some inconsistencies as a closer look shows.

For currency *futures* held by banks the mark-to-market principle applies, and profits and losses due to fluctuations in contract prices are recognised each time a revaluation takes place. For currency futures held by non-banks the effects of those fluctuations are only recognised at the settlement date when the position is closed by a reverse transaction. The same holds for interest rate futures of both banks and non-banks. But, in all cases where settlement basis applies, disclosure rules call for an additional report of market values.

For currency *options* the picture looks more complex. As a rule, premia paid are listed as assets and premia received as liabilities on the day of payment or receipt (see Kuroda *et al.* 1994:53, Bank of Japan 1993b: 45). For options traded by banks the market value principle applies in that profits or losses are recognised after adjusting the premia for prevailing changes. For

Table 4.5 Accounting standards for derivatives

	Banks		*Non-financial companies*	
Instrument	*Accounting standard*	*Disclosure standard*	*Accounting standard*	*Disclosure standard*
Futures				
• currency	Mark-to-market	Mark-to-market	Settlement	Market value
• interest rates	Settlement	Market value	Settlement	Market value
Options				
• currency	Market value	Market value*	Settlement	Market value*
• interest rates	Settlement	Market value	Settlement	Market value
Swaps				
• currency	Accrual basis	No standards	No standards	No standards
• interest rates	Accrual basis	No standards	No standards	No standards

* Applies only to exchange-listed options.
Source: Kuroda *et al.* (1994: Table 6)

all other options of banks and non-banks profits and losses are recognised at settlement. Disclosure rules are the same for banks and non-banks. However, they only apply to listed options while for OTC options only premia are publicised.

The disparity between accounting standards for banks and non-banks is unusual in international comparison. For example, neither the US standards nor the International Accounting Standards (IAS) recognise such a difference.[37] In the Japanese Corporate Accounting Council report of May 1990 this is explained by the fact that the council, as they put it, simply regarded conditions so far as premature for an equal treatment (Bank of Japan 1993b: 45).

Another disparity lies in the treatment of swaps. Accounting standards for banks are based on accrual principles. The value of swapped interest payments is calculated for the period and unpaid amounts are set-off and registered under 'accrued revenues and expenses' (Kuroda *et al.* 1994:53). Notional amounts do not appear in the balance sheet. For non-financial companies there are no definite accounting standards. The JICPA published examples of accounting procedures to be applied in these cases and currency swaps are said to be treated as long-term foreign exchange forward contracts by most companies which means that they are recognised on settlement basis. Banks and non-banks are in a similar situation in that for both of them there are no disclosure standards for swaps.

Market valuation of derivatives can become a rather complex task. This holds particularly for OTC options where no general market price is available but each investor has to calculate the value, taking into account a variety of factors and making assumptions which are inevitably highly subjective.[38] In order to avoid an arbitrary valuation of banks' foreign exchange transactions the Japanese Revised Foreign Exchange Accounting Standard provides for a so-called Reference Bank System. Under this system, principal data such as spreads between spot and forward exchange rates and volatilities of currency options are announced monthly. For example, the range of options volatilities provided is said to cover about 70 per cent of all currency options in the market (Ogawa and Kubota 1995:79). For non-financial companies no comparable system exists.

Seen as a whole, accounting and disclosure rules in Japan refer only to a small part of derivatives transactions so far. Observers consider the lack of standards for swaps particularly unsatisfying (see Kuroda *et al.* 1994:55). Apart from the hidden risks involved when those are used for position taking, several drawbacks of this situation have become apparent in recent years. For example, Japanese banks show a tendency to shun a closing of contracts before maturity when this would unfavourably affect current profits. This unnecessarily limits their scope of action putting them at a disadvantage compared, for example, to their US competitors. In addition, some Japanese banks are executing swap transactions not by themselves but by handing them over to swap houses as overseas subsidiaries which further adds to existing risks because of the lower capitalisation of those institutions.

The discussions and consultations preceding the reforms in Japan showed the difficulties in bringing about a fundamental change. The biggest hindrance is the Triangular System of Japanese accounting which, without major modifications, cannot accommodate mark-to-market on a wider scale (compare Ogawa and Kubota 1995:71, Suto 1996:30). In addition, there are the high costs of adopting market valuation which requires spending significant sums on computers and computer models. They impose a considerable barrier for smaller firms and explain why changes in rules are intended to apply at first only to the largest companies.

One widely used argument against the general introduction of mark-tomarket for financial derivatives lies in the possible disadvantage for firms that use those instruments for hedging purposes. If the hedged asset or liability is not mark to market, but the derivative is, the accounts will show any loss on the derivatives side but not the compensating gain on the hedged position. There is a technique known as 'hedge accounting' which, in principle, could help to avoid this situation but which is hotly debated, and not only in Japan.[39]

The idea behind hedge accounting is to defer a full disclosure of the hedge until it has been completed and losses and gains on both sides cancelled out. This would ease any pressure on firms to unwind the hedge only because losses on one side accrued. In the United States and the United Kingdom hedge accounting is already practised, in the former according to formal rules, in the latter it has been left to firms' discretion so far. The big problem with hedge accounting is that it further blurs the distinction between hedging and speculation. In Japan, the conditions which must be met should hedge accounting be adopted were already specified by the BADC in 1990. One prerequisite was the introduction of 'prior tests' and 'posterior tests' to determine the nature of the position to be hedged, the internal rules a company would have to follow to decide on the respective transactions, as well as the nature of price relations and of losses and gains from both sides of the hedge (see Kuroda *et al.* 1994:56).

The described shortcomings of financial accounting in Japan are not the only ones arising in this context. A major obstacle to Japanese investors developing a sound overall attitude towards risks is the lack of official commitment to existing rules which, in a sense, encourages taking risks or, at least, neglecting them. Regulators in Japan normally provide for long transition periods and always seem prepared to exempt investors from rule changes in their search for a delicate balance between various group interests. Even if a rule is implemented there is no guarantee that the Ministry of Finance will not interfere at times and overthrow it to pursue its own objectives.

To give only one example: the Ministry has become famous for its so-called PKOs (price keeping operations) to stabilise the stock market, and, at times, it makes exemptions from accounting rules for this purpose, too. For life insurers there is a so-called '15 per cent rule' that allows them to report unrealised losses on foreign bonds in their annual financial statements only if the average

yen exchange rate at the end of the fiscal year is more than 15 per cent higher than the average rate at which those bonds were bought. But, if there is a danger that in reaction to those losses the insurers would sell stocks for 'window dressing', and if the stock marked is already depressed, even this rule is abandoned and the currency losses need not be reported at all.[40]

All this is adding to, rather than reducing, risk and in diminishing market transparency and rendering agents' behaviour at times incomprehensible and unpredictable from outside it is increasing investors' general uncertainty. The following chapters will analyse in detail the concrete nature of some of the risks connected with foreign exchange trading in Japan.

Part III
THE RISKS

INTRODUCTION

Due to the increasingly global nature of world financial markets today the risks inherent in each place have become a matter of worldwide concern. High market interdependence means that disturbances are easily transmitted. Advanced computer systems and highly sophisticated information and trading techniques make their effects spread across the globe within minutes.

In this situation, investors and monetary authorities alike show a mounting awareness of the risks connected with foreign exchange trading. The foreign exchange markets are by far the biggest financial markets worldwide, the most dynamic and, at the same time, the least regulated. In this widely uncontrolled world of telephone and computer communication quoted prices for major currencies change up to 20 times a minute and, on a single day, for one pair of currencies up to 18,000 times (see Olsen Associates 1995:5). In April 1995, foreign exchange turnover was about $1.2 trillion daily. This is slightly more than twice the level of annual world exports in 1995. For the same year, new net international bank lending amounted to $315 billion.[1]

Considering the dangers of foreign exchange trading, a general distinction is made between market risks and the more traditional credit- and liquidity risks.[2] Generally, credit or default risk arises from the possibility that a firm will experience a loss when a counterparty fails to perform. Liquidity risk relates to a firms inability to fund its illiquid assets, and market risk refers to possible losses due to changes in market conditions and prices. In all cases, it is less the individual failure which is worrying observers than the danger that a sudden collapse of one or several market participants could trigger a chain reaction throughout the system causing a financial crisis worldwide.

Fear of this so-called 'systemic risk' is the reason for increased activity among private institutions as well as official supervisors and regulators in recent years to cope with the dramatic changes in the world financial environment caused by rapid market growth, the liberalisation of capital flows in many countries and the emergence of new financial instruments and technologies. The discussions focus on three aspects: on exchange rate variability as a source of market risks, the dangers of derivatives trading and the risks inherent in the transfer of cross-border payments. In all three respects, Japan's situation seems a peculiar one.

5

MARKET RISKS

In recent years, currency turmoils and spectacular foreign exchange losses have drawn attention to the risks arising from exchange rate variability. After the breakdown of the Bretton Woods System of fixed exchange rates and the first experiences with a regime of managed floating for major currencies worldwide, two things became obvious (compare, for example, Levich 1985:989–91): purchasing power parity (PPP), the fundamental relation that was thought to tie the economies to one another in the long run, became increasingly blurred, and the growing volatility of exchange rates compared to the variations of related economic variables raised serious doubts about the efficiency of foreign exchange markets. New theories of exchange rate determination emerged emphasising the distinction between long- and short-term influences. Although no complete overview can be given here some of the basic ideas are sketched briefly.

For the long and medium run, the question arose how deviations from purchasing power parity and the wide swings observed in real exchange rates could be explained. Whenever, in a two country world, the prices for the same good differed one would expect an arbitrage process to set in, in the course of which a rising demand in the cheaper place, and a falling demand in the other, would lead to an adjustment process not only of prices but also of the exchange rate between the two currencies involved. A higher demand for the currency of the cheaper country, and a higher supply of the other one, would make the rate of the former appreciate and, together with the price changes, ensure that, at least after a while, the law of one price would hold again.[1]

Over the years, many explanations for observed real exchange rate changes were given. Some of them were compatible with PPP holding in the long run. For example, in an economy only part of the goods produced are internationally traded or tradable, and lags in the price adjustment between the tradables' and non-tradables' sectors are seen as one reason why for general indices, such as wholesale prices or consumer prices, deviations from PPP take place. Another explanation for transitory changes in real rates is the volatility of nominal exchange rates which temporarily drives them away from what is considered a long-run equilibrium path (see Kravis and

Lipsey 1978 and Frenkel 1981). In this case, it is the causes of those short-term movements that remain to be explained.

Other explanations focus on asymmetries in international demand, diverging consumer preferences[2] or productivity and technology gaps and other influences of non-price competitiveness that are thought to have a lasting influence on imports and exports and nominal rates.[3] In addition, there are studies hinting at the possibility of institutional constraints and tarriffs, subsidies and non-tarriff barriers as hurdles to international goods arbitrage. In particular, in Japan, in this context the discussion centres very much on so-called pass-through effects to find out the impediments to price adjustments.[4]

Pass-through refers to the degree to which exchange rate changes are reflected in countries' import and export prices. For example, if a foreign seller of a good adjusts his price in home currency to fully offset any exchange rate change then for this special good pass-through is zero. On the other hand, if the exchange rate change is fully reflected in his foreign-currency price pass-through is one. In short, under any degree of pass-through, for a depreciating country the domestic currency price of inputs should rise while in the appreciating country, in tendency, it should be falling.[5]

One reason for the strong interest in the topic in Japan is that, in the past, real exchange rate changes appeared especially pronounced and lasting for the Japanese yen. For example, studies comparing the behaviour of exchange rates over the long run found evidence for major currencies to drift away from PPP during the period of fixed exchange rates with a clear tendency for real rates to revert to a constant long-run mean after the transition to managed floating in the early 1970s.[6] However, the yen seems an exception in this respect. Until the early 1990s, its real rate appeared to be consistently moving downward. The analysis of price data shows that for many industries hidden trade barriers that are not easily detected may have considerably contributed to this effect.[7]

A second aspect of floating exchange rates was their short-term volatility which perhaps was even more difficult for researchers to explain than the observed long-and medium-term deviations from PPP. With growing experience with flexible exchange rates, successive financial liberalisation in many countries and a strong increase in capital flows worldwide it became widely recognised that, in the short run, the foreign exchange market should be modelled as a market for financial assets.[8] Accordingly, monetary and portfolio balance models were developed which explain exchange rate changes by changes in relative future returns on domestic and foreign financial assets with special emphasis put on unexpected influences and the role of news.

News entered the models with the rational expectations hypothesis. According to this hypothesis agents take all relevant information into account for forecasting future exchange rate changes.[9] Then, those changes can be split into two components, an expected and an unexpected one. The expected change results from changes in the underlying fundamentals which, normally, are not thought to fluctuate to the same extent as the exchange rate.[10] Thus,

volatility must come from the unexpected part and from information of new developments which could not have been taken into account earlier.

The critical question is which news should be incorporated into a model. Empirical works mostly concentrated on the influences of monetary announcements on exchange rates which are easily observable (compare Peruga 1996:167–8). For example, studies on whether news in Japan or in the United States had more influence on the yen/dollar rate during the first half of the 1980s found that, if at all, it was unforeseen US money announcements that seemed to have had the most consistent effects (Ito and Roley 1991). To overcome the difficulties connected with conventional hypothesis testing, some researchers turned their attention to survey data where respondents had been asked about their expectations of the direction and extent of future exchange rate changes for various currencies and time periods without referring to the motives behind.[11] Their results hint at a considerable heterogeneity of expectations as well as a tendency for longer-run expectations to reverse the direction of the short-run ones both casting some doubt on the validity of the rational expectations hypothesis.

It is a general critique of the models discussed so far that they have largely failed in empirical testing and forecasting.[12] Therefore, it is no surprise that their findings are mostly ignored by actors in the foreign exchange markets who are trying to get an idea of the extent to which exchange rates fluctuate and the respective risks of currency trading. In practice, nowadays analysts often refrain from searching for explanations for the sources of exchange rate changes and follow a more modest approach instead, concentrating on a statistical description of currency movements. However, even in these cases, the views of how to measure variability, and the conclusions drawn from measurement, differ widely.

MEASURES OF VARIABILITY

The difficulties start with the definition of risk. Traditionally, statistical risk analysis takes place in a standard mean-variance framework. In this context, risk is distinguished from general uncertainty in that it is possible to assign probabilities to random events or outcomes be they somehow 'objectively' specified or reflecting individuals' subjective judgments (see Machina and Rothschild 1990:227–8). Subjective probabilities involve a transformation of the objective numbers, for example, either to take into account varying degrees of belief among individual decision makers, or to reflect risk-taking attitudes or to fit data in cases where preferences are assumed to be non-linear in probability.[13]

A common procedure to measure objective probabilities is to study frequencies of outcome. For large numbers of observations the distribution of those probabilities is assumed to be normal and entirely characterised by the first and second moment, e.g. by a stable mean and finite variance.[14] Then, the root of the variance, which is the average squared deviation about

the mean, is the standard measure of variability representing the range around the mean in which a certain percentage of all occurrences can be expected to fall. For example, the probability of a normal distributed random variable to be within one standard deviation from the mean is 68 per cent. In the interval plus/minus two standard deviations the probability is 95 per cent and for three standard deviations it is even 99 per cent.

Many analysts and market observers have the impression that financial markets worldwide, in general, and foreign exchange markets, in particular, have become even more volatile since the breakdown of the Bretton Woods system in the 1970s. But there are other voices expressing serious doubts of this view which they regard as mere misperception.[15] In general, the latter seem confirmed by the data.

Table 5.1 shows the long-term volatility of effective exchange rates[16] for various periods before and after the end of Bretton Woods. The overall impression is that there had been no general trend increase in volatility. After some period of adjustment during the 1970s, there has not been much change since the early 1980s and for some currencies, such as the US dollar and the French franc, volatility even declined. For Japan, according to these data the volatility of the yen's effective exchange rate did not change at all between the first half of the 1980s and the 1990s. But, it turns out to be much higher than that of other countries. This indicates a much higher risk of trading in yen than in any other major currency.

However, the results depend very much on the time period, on the currencies chosen as well as on how volatility is measured. Table 5.2 shows the daily volatility of exchange rates *vis-à-vis* the US dollar for several time spans, and the results clearly differ from those above. While for some countries, such as Germany, the United Kingdom and France, volatility has increased in the second half of the 1980s, for Japan the situation looks more favourable in that against the dollar the yen appeared less volatile in recent years.

The differences in the results between the two tables are not only explained by differences between monthly and daily data, between the time periods chosen as well as the currencies involved. The data in Table 5.2 show another specialty in that they are weighted measures of historical volatility. Since often market participants are assumed to put a greater weight on more recent

Table 5.1 Long-term volatility of effective exchange rates*

Country	*1960–69*	*1970–79*	*1980–85*	*1986–89*	*1990–94*
United States	0.2	1.1	1.8	2.1	1.5
Japan	0.3	1.9	2.4	2.4	2.4
Germany	0.7	1.2	1.0	0.8	0.9
France	1.0	1.2	1.1	0.8	0.7
United Kingdom	1.0	1.5	2.0	1.8	2.0

* Standard deviation of monthly changes in per cent.
Source: Edey and Hviding (1995: Table 24)

Table 5.2 Average daily exchange rate volatility *vis-à-vis* the US dollar*

Country	*1974–79*	*1980–84*	*1985–89*	*1990–95*
Japan	6.8	10.1	11.0	10.1
Germany	7.9	11.0	12.0	12.0
France	8.0	11.4	12.3	11.1
United Kingdom	9.0	9.8	11.6	10.5

* Annualised standard deviation calculated on the basis of exponentially decaying weights, in per cent.
Source: Funke and Goldstein (1996: Table 1).

observations, here, exponentially decaying weights have been assigned to past rates.[17] This should, at least in part, explain the numbers for the yen in the 1990s where a period of high volatility in the beginning was followed by a long time of calm more recently.

The question is how reliable are those measures. The central assumption behind the mean-variance approach is that the sequence of occurrences is independent with each one exerting only a small and negligible influence in relation to the total sum. 'Shocks' or outliers are not too big, and not too frequent, to bias the results and they ideally have only once and for all effects. If this view is confronted with traditional theories of exchange rate determination, which are linear in their main arguments, and to which under the assumption of a normal distribution stochastic disturbances are simply added, then the mean of the distribution should represent the fundamental or equilibrium change of the exchange rate which needs to be explained, while the standard deviation would show the normal range of 'noise' or random fluctuations around that value. Under these conditions, given the analytical skills and statistical tools in economics today, the bad empirical performance of existing models is hard to explain. But, perhaps, the conditions are not met.

SOME STYLISED FACTS

In recent years, new technologies and a breathtaking expansion of computing facilities have led to a fundamental change in the way financial data are analysed. Instead of looking at quarterly or monthly, or at best daily, data to detect spheres of influences of price changes proposed by traditional exchange rate theories, nowadays many researchers' attention has shifted to what is called the microstructure of the markets and high frequency analyses of ticker quotes and other intra-day data[18] to detect recurring patterns which can be exploited for forecasting and trading. Most of these activities are not based on strong analytical grounds but rather consist of high velocity number crunching increasingly relying on methods which combine elements from genetic algorithms, neural networks, chaos theory and other concepts.

One result of these developments is that there is a renewed interest in certain 'anomalies' in the statistical properties of financial time series which have been well known for many years but until the recent breakthrough in computer technology could not be studied in depth. The first hint of those 'anomalies' dates back to the 1960s. In 1963 Benoît Mandelbrot published a paper on the variation of commodity price changes which did not appear to be explained by the normal distribution due to characteristics which later on turned out to apply to all kinds of speculative markets, and in particular to the Japanese currency. His results hinted at two peculiarities which, referring to the Old Testament, he called the Noah and the Joseph effect: a non-constant variance and an extremely long-range persistence in the data.[19]

The Joseph effect points to the biblical story of the seven fat years and the seven lean years standing for very long-run dependencies where large positive or negative values tend to be followed by large values of the same sign. Under this influence the time series seems to go through a succession of cycles, including very long ones with a wavelength extending over the total sample size, which, as spectral analyses have demonstrated, at a closer look, prove to be artifacts (compare Mandelbrot 1969:83–4, 95).

Spectral analyses are based on the idea that a stochastic process can be decomposed into a number of components, as there are seasonal, cyclical and trend factors, each one being associated with an ideally theoretically well-founded[20] frequency. Then the power spectrum shows the contribution of each component to the total variance of the process.

In Figure 5.1 the typical spectral shape of a speculative price variable is shown.[21] There is a remarkable concentration at very low frequencies hinting at an overwhelming importance of influences with a wavelength equal to or greater than the length of the series. However, the striking observation is that this basic shape can be found regardless of the length of data available and

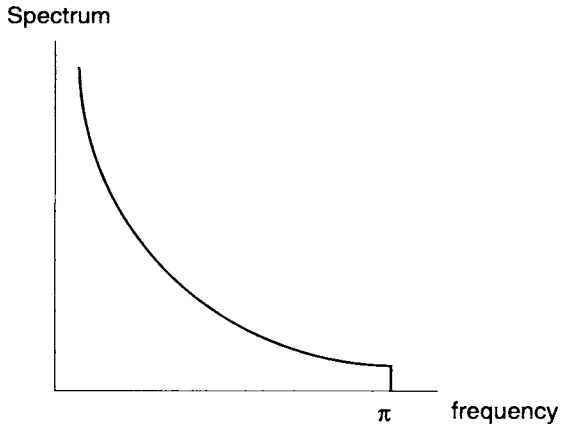


Figure 5.1 The Joseph effect

regardless of whether the analysis concentrates on monthly, weekly or daily data. The series exhibit a kind of 'self similarity' in that, except for a scale factor, the variations roughly show a recurring pattern. The spectrum indicates that they go through cycles but those cycles are not stable. Whenever the length of the data is widened or shortened the cycle length changes as well. The conclusion to be drawn from this phenomenon is that there are very long-run non-periodic dependencies which influence price behaviour. As a result, the normal distribution hypothesis, although still justified for short series where this long-run persistence is not so manifest,[22] appears no longer valid with the lengthening of the sample period.[23]

The second phenomenon, the Noah effect, refers to the emergence of unusually high outliers which come and go like a spring tide. They make different samples of the same time series appear different in that sample variances vary erratically and nothing like 'the' population variance can be estimated.[24] Compared to a normal distribution, on the one hand, the price data show too many small variations and on the other, the large jumps observed are too large as well.[25]

It is the emergence of both influences at a time, the Joseph and the Noah effects, which according to Mandelbrot and others has serious implications for the statistical modelling of the time series. Under the Joseph effect for short periods of time the assumption of a normal distribution as well as the traditional linearity assumption of standard economic models are still valid. On the other hand, the existence of an 'infinite' variance allows to keep the latter only by sacrificing the former. One alternative here is to assume a general stable Levy or Paretian distribution instead, but for most of these the first moments do not exist and general statements about the future become impossible (see in detail Mirowski 1990:86–90).

As soon as both effects come together, the linearity assumption has to be given up once and for all 'for the sake of coexistence' (Mandelbrot 1969:86). There are other serious implications for economic research as well. For example, self-similarity and scale invariance of the time series make the distinction between short and long run in economic modelling flawed when, on the one hand, deterministic effects of any length overlap and, like cascades, build upon one another making prices fluctuate independent of any stochastic interference, and, on the other hand, the smallest influences are persistent and affect the behaviour of the series for long periods of time. Traditional statistical methods are no longer of much use. For example, for general stable distributions leastsquare estimates are not reliable in giving too much weight to outliers and being too dependent on the sample chosen. Time series analyses with ARMA models remain unsatisfactory because, normally, those assume finite processes while the Joseph effect can be thought of as an influence being passed on to infinity.[26] Finally, spectral analyses are not much help either. They try to decompose a time series into a sum of periodic harmonic components

while the Joseph effect leads to an infinite long dependence with the appearing separate periodicities being mere artifacts.

Nowadays, the price behaviour Mandelbrot hinted at is called chaotic and the dimension of the process, which is discontinuous with jumps everywhere, is named fractal. Both have become very popular, not only in economics. Since they have gained importance for exchange rate analysis in general and, as will be demonstrated later on, appear to be of special relevance to the yen in particular, a closer look at some basics of chaos theory as it evolved in recent years and at the way in which chaotic systems differ from traditional views of exchange rate determination seems worthwhile. Since, perhaps, not many readers are familiar with this subject, it will be explained in some detail.

In general, today, chaos stands for one class of deterministic non-linear mathematical systems that show a high sensitivity to initial conditions and an apparently random or irregular behaviour without any stochastic or external impulses at work.[27] These systems are in strong contrast to traditional equilibrium models of exchange rates. The latter need some kind of disturbance from outside, be it a once-and-for-all policy action or another form of exogenous shock, to produce instability. Otherwise they settle at a steady state, a behaviour which is similar to that of a conservative system in physics.[28]

Chaos is a phenomenon that only emerges in so-called dissipative systems. By definition, a dissipative system is one exposed to friction losing, to stretch the physics' metaphor, some form of 'energy'. But, in contrast to a conservative system, a dissipative one is characterised by being open and in a continuous exchange with its environment which hinders it from coming to a standstill.[29] Table 5.3 shows the main differences between the two.

Table 5.3 Characteristics of conservative and dissipative systems

	conservative systems	*dissipative systems*
General characteristics	Closed systems, reversible processes, universal principle	Open systems, irreversible processes, dependence on initial conditions
In analogy to physics	Preserving energy	Losing energy due to friction
Invariants in long-term behaviour	Steady states, transition from one equilibrium to another described by Hamiltonians	Classical attractors: fixed points, limit circles, tori; in chaotic systems: strange attractors
Stochastic behaviour	White noise, due to exogenous disturbances, over the whole parameter range	System immanent, only for special parameter values
Reaction to small disturbances	Adjustment to new equilibrium values	After a period of transition resumption of the former path

Chaotic systems never reach a single point twice.[30] This makes it impossible to study their behaviour by means of stability analysis. Instead, scholars focus on another kind of 'anchor' or invariant to classify them, namely the geometric self-similarity of strange attractors in phase space.[31]

Plotting a chaotic variable in time it is indistinguishable from a stochastic one in that both show irregular fluctuations. But a phase-space portrait where a systems variables are plotted against each others values with time eliminated, and the phase space dimensions given by the number of independent variables or degrees of freedom, unveils hidden structures for the chaotic series while the values for the stochastic ones spread more or less evenly. An attractor is such a hidden structure. It is defined as a subset of the phase space towards which almost all nearby starting points eventually converge. For dissipative systems in general, there are fixed points,[32] limit circles and tori representing stationarity, periodic or quasi-periodic behaviour. And, for chaotic systems that never reach the same point twice there are fractals or so-called strange attractors.[33] These are regions rather than finite sets of points to which trajectories converge and which tend to be filled out by them completely as time approaches infinity.

Whenever in traditional conservative models stochastic behaviour occurs it is exhibited over the whole range of parameter values. By contrast, in dissipative systems regions of stochasticity and regular motion exist simultaneously depending on the value of some forcing parameter. Both systems' reactions to disturbances differ markedly. As a rule, conservative systems adjust to a new equilibrium. Observing their reactions to small changes in the past makes it possible to draw conclusions about their structural relations and their future behaviour under similar circumstances. This allows standard statistical tools to be applied and forecasts made even if the true underlying 'model' is not known.

In contrast, a dissipative system in a sense 'digests' a disturbance and, after some transition period during which it is again winding down to the attractor, it resumes its previous path as if nothing had happened. Looking at its behaviour before and after a disturbance gives no clues to its history. It tells nothing about the systems underlying structure and functioning and thus, in case of chaotic motion which shows no periodicity at all, allows no conclusions about its future reactions.

One characteristic of a strange attractor is that initially nearby points become exponentially separated in time. This is caused by a phenomenon known as 'stretching and folding' (see, for example, Schuster 1989:23). The system's development is on the one hand driven by factors making it expand and on the other slowed down by retarding influences. The result is a kind of interacting cycles which are responsible for the system's path and the much cited sensitive dependence on initial conditions. They create a measurement problem. Even for the smallest differences in starting values after a while the trajectories begin to diverge strongly, and computers which work with finite precision and only approximate numbers are not able to capture these small discrepancies.

Since different computers use different approximations, the results they give for the phase-space trajectories differ as well, and differ widely, and thus are no longer reliable.

Sensitive dependence on initial conditions makes the need to know a systems underlying structure, its parameter values and initial conditions for forecasting much more urgent than in any other case. One form of information which is of great help in empirical investigations is the number of independent variables or degrees of freedom. It gives first hints to the dimension of the system and its strange attractor. According to the Poincaré-Bendixon Theorem any system of differential equations has to have at least three degrees of freedom to become chaotic.[34] This means at the same time that a strange attractor with a fractal or broken dimension has at least a dimension between two and three.[35] However, it still says nothing about the maximum dimension where the search for 'structure' in the data and for a strange attractor should stop. This has to be decided along other criteria.

Since the first works of Benoît Mandelbrot, there have been many attempts to deal with the described 'anomalies' in exchange rates. But, although there is widespread agreement that non-linearities matter, there are mixed feelings about the causes. Chaotic processes that look random but are wholly deterministic are considered to be one possible explanation of non-linear dependence. Another is that the underlying deterministic relations are linear by nature but overshadowed by non-linear stochastic processes so that exchange rate changes should be modelled as non-linear stochastic functions of their own past.[36] Accordingly, the methods to cope with non-linearities differ as well. Most research concentrates on the stochastic aspects, but there are other works as well looking for 'structure' and traces of deterministic chaos in phase space, and still others that explicitly follow the lines of Benoît Mandelbrot in studying the extent of long-run persistence in the data. In what follows, a rough idea of some of those concepts will be given to show the difficulties involved and the implications for risk analysis and forcasting with special reference to the Japanese yen.

LIMITS TO FORECASTABILITY

One method for estimating the degree of long-run persistence in the data which had been proposed by Mandelbrot himself is rescaled range analysis or R/S analysis.[37] The measure gained from this analysis is the Hurst-coefficient, named after a British hydrologist who studied the variation of natural systems through time.[38]

Rescaled range analysis focuses on the maximum fluctuation of a variable over a range of time scales. For example, in financial economics, under the random walk hypothesis, volatility is commonly annualised by taking the standard deviation of monthly price or exchange rate changes and multiplying it by the square root of 12 assuming that the dispersion of returns over a time

index T increases with $T^{0.5}$. In contrast, for a series with long-run persistence the dispersion follows another power law which can be traced by calculating the rescaled range which increases by a value equal to the Hurst exponent.

To determine the Hurst exponent H, first, the time series is successively divided into smaller and smaller non-overlapping subperiods. In each round, the average of the maximum fluctuations in the respective subperiods divided by their sample standard deviation is calculated. This is the rescaled range. In a second step, the log of the rescaled range thus derived is plotted against the log of time and a linear regression is run on this set of data points determining the straight line which best represents the data. The slope of the line is the Hurst exponent.

For a classical random walk or Brownian motion with zero mean and a variance equal to 1 the rescaled range should increase with the square root of time which would give a Hurst coefficient of 0.5. A coefficient of $0.5<H=1$ stands for a long-run persistence in the data, if $0=H<0.5$ this is called anti-persistence or mean reversion. Peters (1994) has applied R/S analysis to the yen/dollar exchange rate (Peters 1994:63–4). For daily data from January 1972 to December 1990 he found a Hurst coefficient of 0.64 which is a clear indication for persistence in the series. It is slightly higher than the one he calculated for the D-mark/dollar rate, which is 0.62, but not significantly so.

Another widely used method for detecting chaos in the data is the calculation of Lyapunov exponents to determine local instability. Lyapunov exponents are generalisations of the notion of eigenvalues (Frank and Stengos 1988:115). They measure the presence and interaction of stretching and folding in a system, and the degree of sensitive dependence on initial conditions, describing how fast initially nearby points diverge in phase space.[39] There is one Lyapunov exponent for each dimension. A positive exponent measures stretching, a negative one folding. Per definition, a dissipative system is chaotic if its largest Lyapunov exponent is positive (Lorenz 1989:191). So far, empirical estimates of Lyapunov exponents for currencies have shown mixed results. For the yen/dollar exchange rate, as well as for some other currencies, the largest number found has been close to zero.[40]

Lyapunov exponents have one drawback. They work best under the conditions of controlled scientific experiments where the influence of stochastic disturbances is low. In economic systems, where the 'true' relations can be expected to be at least to some extent overshadowed and distorted by external effects, the information they provide is less reliable. Stochastic causes as well as deterministic ones can be the reason why initially nearby points in phase space are exponentially separated and Lyapunov exponents are not able to discriminate between them.[41]

The latter objection holds for another concept which is widely used for detecting and describing chaos as well: the estimation of the fractal dimension of a phase space reconstruction and its attractor. Since the 'true' underlying model of the economy in general, and of the foreign exchange market in particular, is unknown it is hardly possible to know all variables relevant to such a system. But, in principle, this does not hinder one from building the

true phase space, as there is a method to reconstruct it from one dynamical variable in filling the other dimensions with lagged values of the one observed, and then estimating the fractal dimension of the chaotic attractor respectively.[42]

The idea behind the estimation procedure for the attractor is based on the concept of the embedding dimension. This is the minimum number of degrees of freedom and differential equations needed to model a chaotic system. It is the dimension of the phase space in which the systems strange attractor can be found. For example, if a strange attractor has a broken dimension between two and three, the embedding dimension is three.

In practice, neither the dimension of the attractor nor the embedding dimension are known. What is done first is to construct a vector space of a series of vectors containing n actual and lagged values of the observable variable which in each vector are slightly shifted in time with overlapping entries. The number of the included values n is equal to the dimension of the 'true' system. The number of vectors M, the so-called M-histories (Frank and Stengos 1988:114), is the maximal dimension of space considered. Generically, the M-histories recreate the dynamics of the system. There is a formal theorem by Takens (see De Grauwe *et al.* 1993:167) which says that for an embedding dimension n a space of at least (2n+1) M-histories is needed to reconstruct the attractor.

The next step is to calculate the correlation integral which is defined as the probability of two points being within a certain distance ε from one another. This is needed to determine the so-called correlation dimension which is considered as an estimate of the system's long-term fractal dimension. The correlation dimension measures the probability that two points chosen at random will be within a certain distance of each other and describes how this probability changes as the distance ε is increased (compare Peters 1991:232). Altering ε changes the number of neighbouring points included in the correlation integral (Frank and Stengos 1988:114). For a completely random series points that are more or less equally distributed in space get included from each of the M-histories. On the other hand, a deterministic system does not exploit all degrees of freedom equally and, therefore, proportionately fewer new points get in when 8 is increased.

The correlation integral depends on the length of the M-histories. For deterministic systems, when M is increased the slope of the correlation integral, which on a log/log scale is the correlation dimension, approaches a fixed value while for stochastic systems it does not stop to increase indicating a process with an infinite number of degrees of freedom (Lorenz 1989:185).

Empirical estimates of the correlation dimension differ. While for some currencies the results point to the existence of low-dimensional deterministic patterns, for others there is no evidence of chaos at all.[43] For the daily yen/dollar rate, as well as, for example, for the Swiss franc, the French franc and the Spanish peseta to the dollar, empirical correlation dimensions converging to values between two and three have been found.[44] The question is how reliable are the findings.

These kinds of analyses demand a high degree of abstraction of the reader. In principle, what is done here is to search through the phase space for a 'saturated value' for the embedding dimension (De Grauwe *et al.* 1993:185), i.e. a kind of clustering in the data hinting at the existence of a strange attractor. However, several reservations have to be made. The first point refers to the mentioned inability to discriminate between deterministic and stochastic systems. For example, the Brock-Dechert-Scheinkman (BDS) statistic[45] which is based on the correlation integral is a test of non-linearity, with the null hypothesis of an i.i.d. process, and not of chaos.

Second, due to data constraints, there are clear limits to the number of dimensions considered. As has been shown,[46] for a number of observations N empirical estimates of the correlation dimension will not exceed the value of $2\log_{10} N$ even in case of white noise. Thus, no dimension estimates should be trusted that are not well below $2\log_{10} N$. Unfortunately, for many studies of financial time series so far this condition has not been met. Estimates for the minimum number of data points needed for determining the correlation dimension differ, but a conservative rule requires for an attractor of dimension d at the 5 per cent confidence level a minimum of 42^d data points (Lux 1994:10). Thus, for example, for an attractor of dimension 6 about $5*10^9$ data points were needed. This, and not a sound theoretical underpinning, appears to be the main reason why in general studies concentrate on 'low-dimensional' chaos.

There is no conceptual foundation which is one reason why the results of empirical studies of chaos in exchange rates so far are at best mixed.[47] There is no *a priori* knowledge, for example, from exchange rate theory, of the dimension of the phase space and the strange attractor one is searching for. However, research on non-linearities is a topic where measurement without theory is like looking for a needle in a haystack.

On the one hand, 'clusters' found in low-dimension tests are no proof of chaos if the dimension of the system is unknown, because stochastic processes of higher dimension may well show 'structure' when looked at from the perspective of a lower one. On the other hand, if no traces of chaos can be found, this does not prove much either if the analysis has stopped there simply because of a lack of computing facilities. One argument often heard is that a search through higher dimensions would not make sense anyway because high-dimensional chaos would be too complex to be distinguished from true randomness. But, an exchange rate driven by the interaction of, for example, six or seven independent influences can well be thought to be accessible to interpretation, in the sense that these influences could be observed and within limits understood by market analysts, even if due to computational constraints the system's strange attractor is not found.

Mixed feelings about the reliability of the various measures help explain why most studies so far combine different tools in one way or the other in their search for chaos and their dealing with non-linearities. Among the eclecticists one widely noticed approach is the research by Olsen & Associates,

a Swiss company, who develop analysis and forecasting systems and trading models for financial institutions and investment managers. They use high frequency data in trying to account for the observed 'structure' in the market with their activities based mainly on three pillars.[48]

The first one is time compression, a manipulation of the data to account for the market's seasonality where phases of strong and weak activity alternate during the day. The study of intra-day events has shown that in the foreign exchange market worldwide there are hours and days where traders in different geographical areas are more active than at other times. For example, on a typical weekday, the volatility of prices tends to be highest when it is afternoon, Greenwich Mean Time, and traders from Europe and the United States are all present. In addition, there are strong activities of European traders in the morning and of traders in the Asia Pacific area around midnight. To account for the resulting seasonality in the data and get a more accurate picture of market behaviour, time is compressed when the markets are least active and expanded for phases of high activity.

The second pillar is the inclusion of heterogeneous agents which is said to explicitly deal with the fractal nature of the market as it shows in the self-similarity of volatility on different time scales. As high-frequency data analyses have demonstrated there are patterns of volatility observed over ten minutes that are similar to those over an hour or over a day. This is explained by traders differing not only with respect to time zones, working hours, home currencies, transaction costs and the like but also with respect to risk considerations and their time horizons. In general, an intra-day trader, for example, has an entirely different view and different objectives from a long-term investor or a central bank intervening in the market.

The third pillar is the development of decision support tools based on genetic algorithms and other techniques to find and optimise simple trading models.[49] Genetic algorithms are techniques to mimic processes of natural evolution as reproduction and selection for optimisation. The basic idea behind this is that they have proved particularly useful tools in highly complex cases where functions have no analytic description and are noisy or discontinuous (Pictet *et al.* 1996:6). Generally speaking, the selection criterion here is the fitness of an individual to adjust to an environment and the quality of the solution offered to a certain problem. Each possible solution considered is coded as a 'gene'. Applied to foreign exchange data, a gene represents a trading model containing elements like indicator parameters, as there are time horizons and a weighting function for the past, as well as the type of operations used to combine them. Then, a fitness function is formulated providing a risk-sensitive performance measure of the various trading models and subjected to an optimisation process.

The application of genetic algorithms is still in its infancy and only one of the many facets of the research based on high-frequency data today. Although somewhat unsatisfactory from a conceptual point of view in its eclecticism

Olsen's success seems impressive. The firm claims to be predicting correctly the general direction of currency markets in over 60 per cent of the time for three-month horizons and over 70 per cent for the longer run. In addition to the many difficulties mentioned above, one problem with deterministic non-linear models in general is the low acceptance of the idea behind the chaos concept among economists. As Charles Goodhart put it in his introduction to a LSE study on multifractals in foreign exchange markets (Vassilicos *et al.* 1992):

> Whereas most of us have no great difficulty with the concept of the existence of non-linear relationships, the idea that the time-path of financial markets is endogenously deterministic, rather than buffeted by the stochastic shocks of unforeseeable 'news', seems hard to accept.

This helps explain why, so far, so many studies dealing with non-linearities in exchange rates focus on stochastic aspects.

In general, stochastic models concentrate on two statistical properties of exchange rates, leptokurtosis and heteroscedasticity. Kurtosis is the name for distributions with 'fat tails'. Normally exchange rates have distributions which show more occurrences far away from the mean and, at the same time, more peakedness[50] than the normal distribution which is a direct implication of the Noah effect. On the one hand, there are far more 'outliers' than predicted by a normal distribution and, on the other, too many small variations. Leptokurtic distributions are characterised by an additional skewness, i.e. by an asymmetry with more, or larger, occurrences in the left half. As a result of leptokurtosis, risk estimates based on the standard deviation tend to give a wrong picture of the frequency of large exchange rate changes and the frequency and/or extent of changes in either direction. In this case, taking into account a change of two or three standard deviations as is often done in risk analyses does not cover 95 or 99 per cent of all occurrences as under the normal distribution but less.

The bias is particularly marked for the yen as the distribution of the Japanese currency normally shows more peakedness and fatter tails as well as more skewness than that of other major currencies.[51] This is also demonstrated in Figure 5.2 which shows the histograms and normal distributions of monthly changes in exchange rates *vis-à-vis* the US dollar for the Japanese yen, the D-mark, the British pound and the French franc respectively.

In general, there are two groups of stochastic models of exchange rate dynamics.[52] Both, in principle, retain the linearity assumption for the underlying deterministic process. The first consists of models which are static in the sense that they have a time independent unconditional distribution. Included here are above all the stable Paretian distributions, a mixture of normal or stable distributions, mixed-jump processes and the Student distribution.[53]

Stable Paretian distributions are related to a generalisation of the central limit theorem which says that a sample of independent identically distributed random numbers with finite variance which approaches infinity has a probability

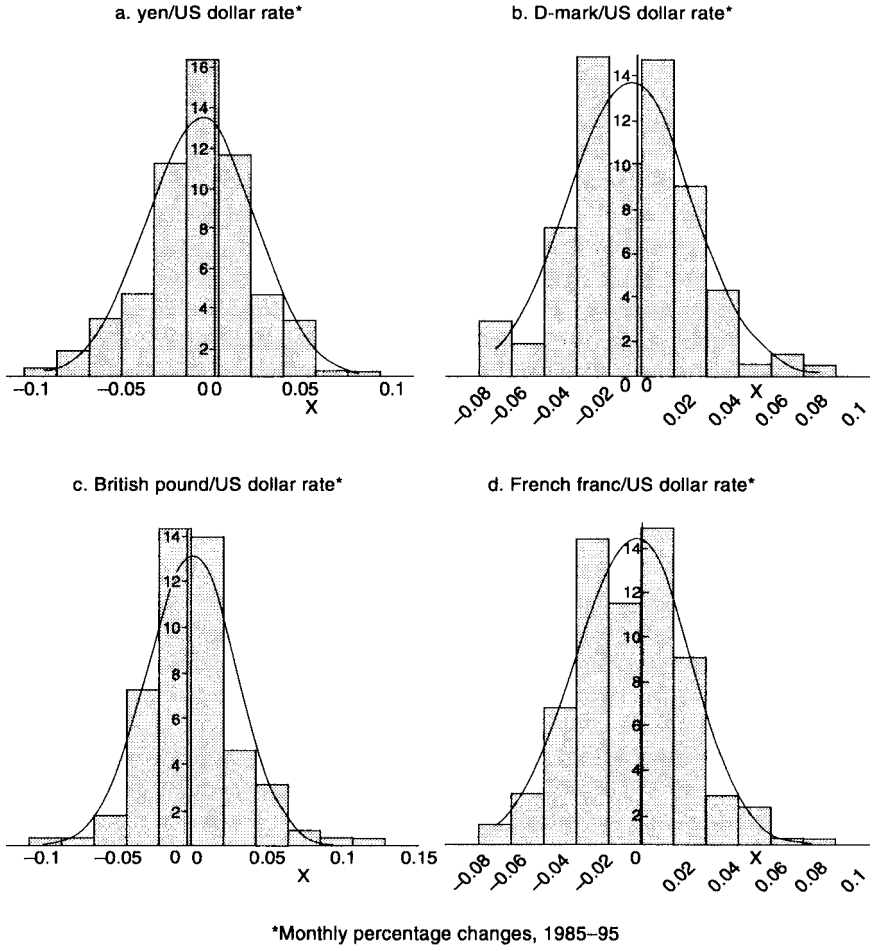


Figure 5.2 Histogram and normal distribution

density function which approaches the normal distribution. Dropping the assumption of a finite mean and variance leads to the family of stable Paretian distributions in general. Thus, the normal distribution is just a special stable distribution. Paretian distributions are 'stable' in the sense that the values for the characteristic exponent do not change under summation.

Generally, for stable Paretian distributions closed form expressions for the density or distribution function are not available and they are described by the log-characteristic function. It is determined by four parameters which can be related to the first four moments: a location parameter describing centrality (i.e. for the normal distribution this is the mean), a scale parameter describing

dispersion (the standard deviation for the normal distribution), a skewness parameter which is zero when the distribution is symmetric, and the characteristic exponent which determines the highest order of finite moments within this family of distributions. With a characteristic exponent smaller than two the variance is infinite, with a characteristic exponent equal or greater than one the expected value (as well as all higher moments) is not finite (see Kaehler 1991:6–7, Boothe and Glassman 1987:298–9).

In the first existing work on the foreign exchange market Westerfield (1977) studied the behaviour of exchange rates for five countries, Canada, the United Kingdom, Germany, Switzerland and the Netherlands, and found strong empirical evidence for a characteristic exponent of less than two showing that the normal distribution is indeed an inadequate description of the observed distributions compared to other stable distributions. In addition, estimating the characteristic exponent for several non-overlapping sums of observations shows a high degree of stability indicating that the underlying distributions probably are not a mixture of normal distributions or unstable alternatives such as the Student distribution proposed elsewhere (compare Westerfield 1977:193, Boothe and Glassman 1987:301).

Later studies re-examining Westerfields results failed to reach consensus regarding the type of distribution. One possibility seen was the just mentioned case that exchange rate changes are characterised by complex combinations of normal or stable distributions that have the general appearance of a non-normal stable distribution (see McFarland *et al.* 1982:694–5). One explanation given for those 'compound processes', which have location, scale or characteristic exponent parameters which are different for different subpopulations, are trading day effects with distributions of price changes differing for each day of the week (McFarland *et al.* 1982:696–7). The evidence found here suggests that for all currencies investigated, including the Japanese yen, the estimated characteristic exponents were below two with substantial variations from day to day. Price changes were observed to be high on Mondays and Wednesdays and low on Thursdays and Fridays. The Wednesday-Thursday results are explained by settlement procedures, the Friday-Monday effect by an increased demand for dollars before the weekend.

Another alternative to the stable Paretian proposed is a mixed-jump process or mixed diffusion-jump process (see, for example, Akgiray and Booth 1988, and Tucker and Pond 1988). It is modelled by combining a Brownian motion, or continuous diffusion process, and a discrete jump process the latter being an independent and homogeneous compound Poisson process with normally distributed jump amplitudes. A mixed-jump process is capable of describing two types of exchange rate behaviour at the same time: normal small variations satisfying a local Markov property[54] and abrupt large fluctuations thus capturing both local and non-local dynamics (Tucker and Pond 1988:640). The process is defined by five parameters: diffusion mean and variance, the jump intensity measuring the occurrence rate of Poisson jumps, and the mean and variance

of the jumps. Tests of mixed-jump processes for major currencies, including the Japanese yen, claimed to have found them superior to other static distributions including the final variant presented here, the Student distribution.

The Student distribution is described by three parameters: location, scale and degrees of freedom. It approaches the normal distribution as the degrees of freedom approach infinity. For a degrees of freedom parameter greater than 2 the second moment exists. The parameters of the Student distribution are not constant under summation of observations. The distribution is a continuous mixture of normal distributions with different scales with the mixing distribution the chi-square (see Boothe and Glassman 1987:299). Comparing the empirical fits of three non-normal distributions, the Student, the stable Paretian and a mixture of distributions, with that of the normal distribution for daily data for major currencies, including the Japanese yen, Boothe and Glassman (1987) found the Student and the mixture of two normals to provide the best characterisation. Several other studies confirmed these results.[55]

Although there is no general consensus about the superiority of one or the other static distribution 'naive' static models like the ones described have proved superior with respect to precision in forecasting experiments compared to the second group of stochastic models which are dynamic models of the ARCH type.[56] Their advantage is that in contrast to the former they are able not only to account for the observed 'fat tails' of the distributions of exchange rate changes, but in assuming that occurrences are not independent they can capture the second statistical property found as well, the infinite variance or heteroskedasticity.

Dynamic ARCH-type models assume that exchange rate changes are stochastic functions of their own past. ARCH stands for autoregressive conditional heteroskedasticity. ARCH processes can be defined in many ways, for example, in terms of the distribution of the errors of a dynamic linear regression model. In its simplest form ARCH names a process where the dependent variable is equal to an error term which is conditionally normal distributed with zero mean and a variance being a quadratic function of the lagged value of the dependent variable (see, for example, Hsieh 1989:340–1). The idea behind this concept is to model a stochastic process for which the time series shows little or no serial correlation and yet the dependent variable is not stochastically independent of its past. Thus, for these processes traditional tests of linear dependence will not detect what is a non-linear dependence in time.

ARCH-type models are widely considered to be an alternative to the above described chaotic deterministic processes of non-linear behaviour in that they can account for the fact emphasised by Mandelbrot and others that large price changes are followed by large ones, and small changes are followed by other small ones, of the same sign. Since an original deviation from the mean in one period enters the error term of the equation determining the dependent variable in future periods, times of high dispersion are accompanied by a stronger than normal concentration of observations in the tails of the distribution, while in times of low dispersion where small deviations from the mean are

passed on through the error term to future periods the concentration is found in its peak (compare Takagi 1989:68).

There are several modifications of the original concept. Today, the most widely used in studies of exchange rate changes is the generalised ARCH, or GARCH, model. The basic idea behind this is to generalise the conditional variance by making it a linear function of the squared lagged realisations of the dependent variable as well as of the lagged variance itself. The intent is to allow both for a longer memory and a more flexible lag structure (see Mills 1992:329).

Hsieh (1989) estimated generalised ARCH models for major currencies. Although his results confirm that conditional normality has to be rejected, and a GARCH (1, 1) model using conditional non-normal distributions can describe the behaviour of some currencies at least reasonably well, none of the GARCH models used fits the distribution of the yen. Similar results for the Japanese currency have been found by other studies as well (see, for example, Kugler and Lenz 1990).

A general critique of ARCH and GARCH models is that they are not known for their predictive power. Most academic literature in this field is said to focus on fitting past data, not on forecasting (see also Rappoport 1995:24). From an analytical point of view the dynamic stochastic models of exchange rates remain as unsatisfying as their static counterparts in that they are mere descriptions of processes giving no hint at where to search for an explanation of the sources of variability. But, in particular for non-linear processes determined by complex interactions such as exchange rate movements, it holds that measurement without theory is loaded with high uncertainties since no conclusions about future price changes can be drawn from observations of the past, and there is always a danger of unforeseen 'regime switches' which may fundamentally alter the system's behaviour. The problem becomes even worse for financial instruments where the value of a position itself changes in a non-linear way with changes in the exchange rate. This is the reason why derivatives are a growing source of worry today as will be described in the following chapter.

6

DERIVATIVES

Since derivatives trading has a considerable weight in Japans foreign exchange market the riskiness of that market depends to a large extent on the way in which Japans financial institutions cope with the resulting challenges. In order to analyse their respective abilities in detail at least some understanding of where the challenges come from is needed. Thus, in what follows, some space will be devoted to a more general introduction to risk analysis and risk management practices. Attention is focused on options trading where asymmetries in the distribution of risks and non-linearities in the relation between the position value and a price change of the underlying asset impose special problems. The recent growth of trading in those instruments requires an approach to financial management and risk analysis which is completely different from traditional concepts and methods and which in particular Japanese firms have found difficult to implement so far.

ASYMMETRIES AND NON-LINEARITIES

In allowing an unbundling of price risks derivatives contracts have many advantages. Firms that wish to get rid of an unwanted risk can hedge their exposure at low cost while investors taking the risk gain flexibility in structuring their trading and investment positions. With respect to the risks related to financial assets and liabilities users become able to trade away those risks they do not want to be exposed to while, at the same time, retaining others. With individual risks becoming tradable, differences in risk preferences of lenders and borrowers can be resolved (Kambhu *et al.* 1996:1).

Another advantage is the low capital amount needed due to the leverage of those instruments. It allows the holder to get the same potential return an outright buyer of the underlying asset may receive for a much smaller amount invested. However, leverage is a double-edged sword. If the price of the underlying instrument changes by a small amount, the change in wealth, be it a gain or loss, for the holder of a derivative position is much greater measured as percentage value. But, the nature of this risk is not the same for all kinds of derivatives.

A first difference is the distribution of risks between the contracting parties. For forwards and futures it is symmetric: the risk of loss for the one mirrors the chance of profit for the other. With regard to options it is asymmetric because, in contrast to the former instruments, options are based on the insurance principle. For example, the buyer of a call option pays a premium to the seller, also called the option writer, thereby sheding the risk of an unfavourable change of the price of the underlying asset. If the feared price change does not happen, and the option is not exercised, it is only this premium which is lost. On the other hand, the seller has the obligation to deliver if the option is exercised which means that for him if prices move in the wrong direction and he does not already own the underlying asset he has to buy it in the market and his loss may become very high. His risk is, in principle, unlimited (see Labuszewski *et al.* 1986:21).

A second difference refers to the sensitivity to changes in market conditions. While for futures and swaps the relation between a price change of the underlying and the derivative is a linear one, for options the picture looks completely different. Here the leverage is not constant but depending on a variety of influences which may change very rapidly. And, there is always room for doubt about an options value since there is no generally accepted model for options pricing.[1] Successful options trading is more or less a matter of identifying an options fair value.

The model most widely used in options pricing is the Black-Scholes approach. It is based on the following assumptions: it is possible to trade continuously in the market; there are no price jumps; there is a risk-free rate of interest for borrowing and lending which is constant over the whole life of the option; there are neither transaction costs nor taxes; the price of the underlying asset is log-normally distributed (Walmsley 1996:205). Under these assumptions, the option price is determined by a formula containing the current price of the underlying instrument, the options exercise price, its remaining life time, the level of interest rates and the projected volatility of the underlying instrument. Those five factors combine in a way that, in contrast to most other financial instruments, the relationship between the position value and the market rate becomes non-linear, and expected changes in value can no longer simply be calculated by multiplying estimated changes in rates by a given constant sensitivity of the position to changing rates as in traditional risk analyses (JP Morgan 1995:30).

Given the complexity of the instruments, dealers use several measures of sensitivity and risk in options trading. The most important one is the delta. It measures the change in the price of the option resulting from a small change in the price of the underlying instrument. The more the option is in the money, i.e. the more the current price of the underlying asset is exceeding the exercise price or strike price of a call option (or is below that of a put option), the more sensitive is its price to that of the underlying asset. The delta in a sense measures the probability that the option will be exercised. To hedge a spot position deltaneutral means to buy as many options as necessary

to keep the value of the portfolio immune to changes in the price of the underlying asset. Delta-hedging is not always effective since it does not work for large price jumps which would create a change in the value of the delta-neutral portfolio (compare Dubofsky 1992:230).

The next important measure is the gamma. It describes the sensitivity of the delta to changes in the price of the underlying asset. The gamma shows the stability of the delta. It is highest when the option is at the money, that is when the strike price equals the price of the underlying asset. In this situation, smallest changes in the price of the underlying asset trigger large responses of the delta. For a delta hedge the gamma contains the most vital information indicating how often the hedge must be adjusted and implicitly how costly it becomes (Walmsley 1996:217). A third measure is the kappa or vega. It shows the effect of a change in implied volatility on the option premium. The implied volatility is calculated by taking the market price of the option as given, for example, in choosing a price quoted by others, and then trying to find a variance or standard deviation consistent with that price. Further, there is the theta which measures the impact of a shortening of time until maturity on the option premium, and the rho which indicates the sensitivity of the option price to changes in interest rates, and some more.

Due to the non-linear nature of options, where small changes in one determinant may lead to large variations of the options' value risk analyses sometimes come to strange conclusions. For example, situations may arise where simulations with standardised variations consistently show profits while potential losses would occur only in the non-simulated intervals in between.[2] As a result, intuition and the 'feeling' for risk based on experience and looking at a few key numbers which determined decisions in so many traditional financial areas is no longer reliable at all and complex mathematical analysis becomes an indispensable tool. This makes the use of those instruments, at least under proper risk management, expensive as well as time-consuming.

In options valuation much depends on the calculated volatility of the underlying instrument. In practice, as a reaction to the fact that the variance of a financial time series is 'infinite' and there is nothing like 'the' volatility the calculation method applied differs from firm to firm. The problem is that the volatility of an asset for a certain period of time is only known *ex post* but for options pricing as well as risk analysis it would be needed *ex ante*. In principle, there are two ways to measure volatility: estimating a historical volatility from past data or deriving an implied volatility from the observed option prices of other market participants. Both methods have their drawbacks. For historical volatilities there is the problem of chosing an appropriate time series, deciding about its length and about if and how to weight more recent observations, determining how to deal with the volatility of volatility and many more. On the other hand, implied volatilities do not always exist, which holds for example for OTC options, and, in addition, implicitly may include price elements that could not be separated such as transaction costs,

risk premia or earnings components.[3] Thus, both concepts are not particularly reliable measures of future variations.

For economists and other observers studying the behaviour of major currencies implied volatilities for currency options sometimes fulfil the role as an indicator of general sentiment in the foreign exchange market. In this function they are closely related to the concept of risk reversal.[4] Risk reversal is defined as the difference in price between an option paying off in the event of a large currency appreciation and one that is paying off in the event of an equally large depreciation. For example, during the last years, the yen/dollar rate was showing a very small differential. It gained much attention when in spring 1995 risk reversal for this pair of currencies made up to 1.6 percentage points, the highest number for years.

Due to their special nature values of options contracts can change extremely rapidly. The same holds for the price sensitivity and volatility of a position. This makes it necessary for a dealer or portfolio manager to track constantly the positions and the changes in his variables resulting from market movements. Another basic consequence is that with the growth of derivatives trading the methods of financial management experience a fundamental change. As will be demonstrated, financial institutions in Japan are not always well prepared to meet the resulting requirements.

RISK MANAGEMENT PRACTICES

As earlier chapters have shown, derivatives trading worldwide has grown dramatically since the second half of the 1980s. The reasons for this are manifold (compare Okina 1995b: 66). The transition to floating exchange rates in many countries, an increasing volatility of financial and foreign exchange markets, an ongoing financial liberalisation, a tendency towards stronger globalisation of firms' and investors' activities and the resulting interest rate and foreign exchange risks are the common factors named which led to a mounting need for hedge instruments, in Japan and elsewhere. In addition, there has been an increase of what is called financial engineering of banks in the course of which institutions started to offer and trade new financial instruments. Their motives were on the one hand the search for new sources of income after financial liberalisation had made them face tougher competition and shrinking returns in traditional markets, and on the other hand a growing concentration on off-balance-sheet instruments in reaction to the introduction of international capital standards for on-balance-sheet activities by the Bank for International Settlements. The third and decisive factor for the 'derivatives revolution' has been the development of computer and information technologies which for the first time enabled participants to perform the complex pricing calculations needed for options trading and risk analysis in this new environment.

One consequence of these developments is that, slowly but steadily, the nature of financial management is changing. The traditional method in classical

banking business is asset-and-liabilities management (ALM) where future estimated earnings are projected periodically under assumed market scenarios and the results are reported in financial statements under generally accepted accounting principles. Many activities are reported on an accrual basis. Transactions are booked at historical costs plus/minus accruals. Only very few positions are constantly marked to market, and market risks in trading positions are usually measured differently and managed separately from the rest. The main drawback of this concept in light of recent growth in markets for offbalance-sheet instruments is that ALM supports the illusion that gains or losses occur when they show up in the books and are realised according to accounting principles (compare JP Morgan 1995:7–8).

For non-linear positions such as options the calculation of the stream of future cash flows is no longer possible. They can only be evaluated mark-to-market with the value of the position at changed rate levels being compared with the value of the position before. In addition, in principle, to ensure comparability a 11 underlyings and other on-balance-sheet items standing in any relation whatsoever to the derivative position have to be evaluated in the same way. Another problem is that in estimating levels rather than changes in rates, correlations between prices of different instruments that do not move independently have to be taken into account which makes calculations much more cumbersome (JP Morgan 1995:30).

An alternative to traditional asset-and-liability management is value at risk (VAR), a concept which more and more is moving towards becoming the new international standard for risk management.[5] VAR is a price sensitivity analysis measuring the potential losses in a portfolio's total value from changes in market conditions. Losses are expressed in terms of some confidence interval. Option pricing models are used to explicitly revalue the portfolio over a set of postulated price changes which are gained either from a scenario approach or a simulation method.

For the scenario approach several distinct values of the option's underlying asset within a given interval are taken with, for example, the interval defined by the current price plus/minus three standard deviations of monthly price changes where under a normal distribution 99 per cent of all observations could be expected to be found. Alternatively, it is possible to simulate the price changes using historical values or Monte Carlo methods with the entire portfolio revalued at each point generated by the simulation. In all cases, the value at risk is the largest loss calculated or, depending on the desired degree of confidence, some conservative percentile of the losses (Estrella *et al.* 1994:30). The main difference between the two kinds of concepts is that while the scenario approach focuses on a more limited number of specific price movements, simulation approaches cover a more continuous range of changes and their effects on the entire portfolio value. In addition, they may facilitate the inclusion of additional variables such as an options time value or its sensitivity to interest rate changes (see Estrella *et al.* 1994:40).

Sometimes both approaches are combined with first- and second-order approximations of an options portfolios price sensitivity based on delta and gamma values.[6] In these cases, the portfolio is not continuously revalued at each simulated price change as under the Full Valuation method but the change in the portfolio's value is approximated on the basis of an option pricing model. For example, the Delta Valuation method uses the delta value of a portfolio to determine potential losses. The delta value represents the net portfolio value as the arithmetic sum of the deltas of all instruments and transactions in the portfolio. Under the Full Valuation method the potential loss is the difference between the portfolio's value at potentially changed rates and at the original rate. Under the Delta Valuation method it is calculated as the sensitivities of the respective positions to changes in rates times the potential changes in rates.[7] But although the approximation is based on an options pricing model its results are necessarily less accurate than the explicit use of the model itself (Estrella *et al.* 1994:31).

There is a danger for the delta-equivalent to underestimate risk because it is a linear approximation to a non-linear phenomenon. This error can be reduced by incorporating the gamma value thereby additionally taking into account the risk that the delta changes as the price of the underlying asset moves.[8] However, second-order approximations are not necessarily more accurate than firstorder approximations, particularly when market movements are large. Another possible modification is the additional incorporation of volatility risk accounting for the fact that, in contrast to other financial instruments, option prices are dependent on changes in volatility as well.[9]

The computational requirements of these models and thereby the costs of adequate risk management and provision can become very high. This may impose insurmountable obstacles in particular to smaller banks and investors and to all financial institutions that are not well equipped with the respective computer facilities. The latter holds in particular for banks and other financial institutions in Japan whose computerisation must be regarded as still insufficient in many respects.

In general, the process of computerisation of financial institutions and services in Japan since the mid-1960s can be divided into three broad periods.[10] The first stage reached to the mid-1970s. In this time Japanese banks started to develop online nets for their internal operations focusing on the saving of labour and an overall increase in the efficiency of banking business. Insurance companies began to speed up their main business activities and render them more efficient with the help of computers and at the same time built up first links between headquarters and branch offices. Securities houses which during the 1960s had already started to automate their general batch processing modernised their stock order system at the beginning of the 1970s.

During the following ten years, from the mid-1970s to the mid-1980s, the banking sector extended and modernised its online functions and strengthened the electronic links between banks. Insurance companies began to establish a computer network all over the country and securities firms, aiming to improve

their customer service as well as supporting their own trading activities, concentrated on the development of their computerised investment information system.

It is only since the third stage which started in the mid-1980s that in Japan's financial sector computer systems became more widely used for trading purposes and that connections to places outside Japan built up, and external trading and information links were established on a large scale. This stage comprised among other things the development of computerised support systems for foreign exchange trading and dealing as well as for trading in foreign securities. One of the hurdles overcome at this time, at least for the big institutions, was the establishment of an information system which allowed a complete asset-and-liabilities management in foreign currency along traditional rules, a development which for many other institutions still cannot be taken for granted.[11] For the banks, besides labour-saving and efficiency increases, a third aspect gained more and more importance. Under the impression of a financial crisis and a general worsening of economic prospects, the defence of market shares and the maintainance of a position in relation to other banks as well as other financial institutions which were squeezing into traditional bank markets became crucial, and computer systems were increasingly considered a competitive advantage in this respect.

For most institutions the development process has a long way to go. In March 1993, many Japanese banks were still in the course of implementing the third stage, while others hesitated to enter it, and still others were not planning to install it at all. Less than 75 per cent of all institutions asked at that time regarded the process as completed. Among the most advanced were the trust banks, the city banks and the long-term credit banks, the weakest were found among the second order regional banks where not even half considered the third stage as finished.

But, with respect to risk management, even the largest banks have had problems.[12] For example, it was only in summer 1996 that in reaction to an announced change in official regulations, following a release of guidelines by the Bank for International Settlements in 1994, Sumitomo Bank, one of the large city banks, was reported to have introduced a Value-at-Risk concept. The system was developed in collaboration with the Nippon Steel Corporation, the NTT Data Communications Systems Corporation and the Japan Research Institute and was said to cost about ¥10 billion. With this decision Sumitomo was obviously regarded as at the forefront in this field. Up to now, Sakura Bank, Sanwa Bank and the Dai-Ichi Kangyo Bank have introduced similar systems, and in preparation for changes in official rules in the Fiscal Year 1997 all major city banks are planning to introduce VAR systems. However, initially, these will only be used to manage risk in interest rate instruments.

Compared to these banks big non-bank enterprises are said to have even greater problems in controlling market risks. This holds especially for the big trading companies. Due to their vast range of activities, which includes not only currency trading and quasi-banking functions but also trading in commodities spot and futures markets for energy, agricultural products, rubber, precious and base metals and many more, and because of their wide regional dispersion

their risks are even harder to monitor and control, and risk management officials in those companies are said often to have great difficulty in keeping track of the trades despite the fact that all have a central risk management unit.[13]

Insufficient computing facilities are widely regarded as one reason why, for example, with respect to the management of derivatives risks many Japanese banks are considered to be far behind their counterparts in the United States and Europe. In addition, they may serve as one explanation of why for the institutions traditional derivative instruments like forwards and swaps play a much greater role in foreign exchange trading than currency options.

Despite the obvious backwardness, in the early 1990s, many financial institutions in Japan which were weakened by the long-lasting recession, generally sinking returns and the after-effects of the burst of the speculative bubble, even slowed down expenditures for computerisation. As Table 6.1 shows this not only holds for the banks but for Japans securities houses and insurance companies as well. It appears to be the case, as often reported, that the general willingness and ability to invest in large risk management systems is not particularly high. Japanese regulators, for example, make allowances for this fact in that so far their approach to off-balance-sheet positions differs for banks which already have reciprocal facilities and others which are not able to meet the requirements (see Hall 1993b: 208).

Japanese institutions do not stand alone with these problems. In October 1994, the US investment bank JP Morgan received wide attention with its decision to make its own internal system for measuring financial risks, RiskMetrics, available to the public and provide information of daily movements in interest rates, exchange rates and equity indices free of charge. The main motive behind the move was to promote greater transparency of risks and the hope that the use of common numbers and a common framework among

Table 6.1 Computerisation expenditures of Japanese financial institutions[a]

	1990	*1991*	*1992*	*1993*	*1994*[b]
202 reporting financial institutions	20.5 (1.6)	–10.6 (1.5)	–5.4 (1.4)	–17.7 (1.1)	0.8 (1.2)
among which:					
150 banks	20.9	–8.8	–1,8	–21.9	5.0
27 securities houses	34.3	–27.1	–22.8	–17.6	–10.1
25 insurance companies	5.9	3.2	–2.6	–3.1	–4.4

a Yearly percentage change, in parentheses the actual amounts in trillions of yen. Investments for computerisation include expenses for new computer centres, hardware (purchased as well as leased) and software (development expenditures as well as purchases and leases of operating systems and all kinds of package programmes),
b Planned expenditures.
Source: Nagahata (1994:129)

institutions would stimulate discussion and lead to a more effective use of derivative products (see for example, Lapper 1994a, b).

The decision, which raised some eyebrows among the firms competitors, must perhaps be seen against the situation prevailing at that time. Debates over the regulation of derivatives had intensified after a series of big losses incurred by companies such as Metallgesellschaft and Kashima Oil. Recent studies by the Bank for International Settlements and the Group of Thirty had among other things strongly recommended the use of a consistent measure to calculate market risk, and the head of the Group of Thirty Global Derivatives Study Group, Sir Dennis Weatherstone, was the chairman of JP Morgan.[14] Thus, the decision to make the firms own system publicly available can be considered not only a means to gain longer-term commercial advantages through strengthening ties with customers but also in order to become a forerunner of a development which was on the horizon.

RiskMetrics provides data needed for daily risk evaluation and a methodology for measuring market risks. It offers information on rates and volatilities and over 100,000 correlations between more than 300 financial instruments in 15 markets. The model enables users to analyse the risks of their own portfolios within a consistent frame and compare alternative investment strategies. The information is provided through the Internet as well as through other channels.

It is worth taking a closer look at RiskMetrics, which may serve as an example for the possibilities and limits of financial risk analysis and risk management in the complex world of derivatives and the challenges banks and other institutions face today in this environment. The model defines two different measures of market risk (see JP Morgan 1995:28). The first is Daily Earnings at Risk (DEaR) which describes the maximum estimated losses on a given position that can be expected to occur over a single day with 95 per cent probability. The assumption behind this is that in most developed and liquid markets positions can be unwound or neutralised within one day. The second measure is the Value at Risk which, assuming that there are situations where positions cannot be unwound within 24 hours, or the decision horizon of the investor is a longer one, gives the maximum estimated losses in the market value of a position until it generally can be neutralised or is reassessed. In theory, the time horizon can be a function of either the investor or the position. For a one day horizon the Value at Risk would be equal to the Daily Earnings at Risk. In practice, RiskMetrics calculates 25-day volatilities and correlations as an approximation for one month for the Value at Risk (see JP Morgan 1995:63).

Figure 6.1 gives an overview of the RiskMetrics methodology. The model consists of several building blocks distinguishing between various kinds of positions which need a different valuation treatment. It proceeds from accounting over valuation to simulation. Starting from the level of accounting it draws a first line between accrual items and trading items with the latter further divided into marketable and non-marketable items. The second level is valuation. The most simple case here is those trading items for which a liquid secondary

THE RISKS

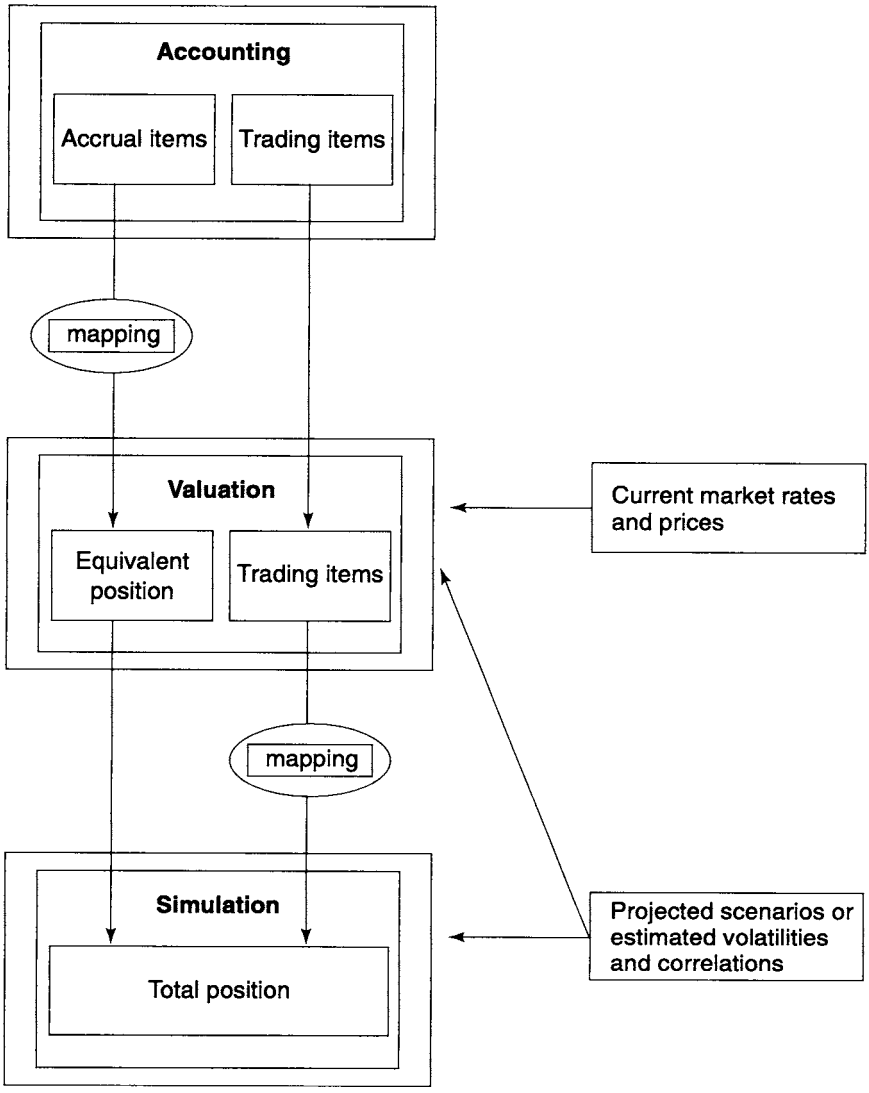


Figure 6.1 The RiskMetrics methodology

market exists, for they are valued at their current market value as quoted in that market. Transactions for which there is no market value, but which can be decomposed into parts for which secondary market prices exist, are treated as a combination of cash flows from these parts and then mapped into so-called equivalent positions with their value approximated as the sum of market values of the component cash flows (see JP Morgan 1995:10–12).

The real difficulties start with non-marketable items containing options because for their valuation volatilities and correlations as well as an options pricing model are needed. Here, two alternatives are considered: the Delta Valuation method and the Full Valuation method. The choice between the two depends on the characterisation of what kind of position is to be evaluated in which type of market environment.[15] If the positions contain only options far from expiry and deep in or out of the money, the relation between changes in the position values and changes in rates and prices can be treated as a linear one. In this case, the Delta Valuation method is considered as sufficient, otherwise Full Valuation is regarded as superior. At the moment, RiskMetrics is concentrating on the parametric approach, i.e. on the Delta Valuation. In addition, volatilities derived in RiskMetrics are based on historical values, because, so far, the user is informed, data on implied volatilities are not available for a greater diversity of options markets to provide all volatilities and correlations needed.

The last step is the simulation of the changes in value of the entire portfolio as a consequence of expected changes in market rates and prices. To this purpose, in principle, the potential price and rate changes can be gained either by designing specific scenarios or by estimated volatilities and correlations. If the position value depends only on a single rate then depending on the approach chosen the change in value is a function either of the rates in each of the scenarios or of the volatility of that rate. If the potential change in value is depending on multiple rates it is a function of either the combination of those rates in each scenario or of each volatility and each correlation between all pairs of volatilities (JP Morgan 1995:11).

There are some reservations against the scenario approach. On the one hand, scenarios based on what is called 'educated guesses' or selected historical periods have the advantage that they are easily able to describe markets under nonnormal conditions and instability. However, users are warned that this kind of scenario design contains a highly arbitrary element and can be hazardous. RiskMetrics tries to circumvent these drawbacks in generating most scenarios used in the model automatically by means of 'structured' Monte Carlo simulations. What is done there is to construct sets of scenarios based on historical volatilities and correlations and take those to extrapolate current or forward rates and prices to come to estimates of future volatilities and correlations.[16]

The RiskMetrics technical document considers various possible alternatives for estimating volatility based on historical time series ranging from moving averages with fixed, equal weights over exponential moving averages to ARCH and GARCH-type models of time-dependent volatility (see JP Morgan 1995:74–7). Given the additional complexity of the latter ones, and the feeling that their relative predictive performance improvement is only small, the decision ends in a compromise in favour of exponential moving averages with a decay factor placing relatively more weight on recent observations. Thus, volatility estimates respond very quickly to market shocks and revert gradually back to more 'normal' levels (Walmsley l996:238).

RiskMetrics does not insist on following a uniform approach to risk estimation but propagates a combination of diverse concepts. Table 6.2 gives an overview of the main components that should ideally determine risk management according to the RiskMetrics methodology. The procedures chosen should depend on market conditions and environments. Here, the most important characteristics are the distribution of rate and price movements on the one hand and the functional relationship between a position's value and changes in rates and prices on the other (compare JP Morgan 1995:14).

Consider first the distribution aspect. In cases where rate and price movements can be statistically described as following a normal distribution traditional variance/covariance analysis should be applied. However, if the normality assumption cannot be expected to hold, then traditional risk measures become

Table 6.2 Components of the RiskMetrics methodology

Characteristics of market movements	*Valuation methods*
⇒ Distribution of rate and price movements	⇒ For marketable trading items current market value
(a) normal distributed	⇒ For non-marketable accrual items mapping into an equivalent position
• analysis tools = volatilities, correlations	⇒ For non-marketables containing options
	(a) Delta Valuation method
(b) non-normal distributed	• parametric
• analysis tool = scenarios	• gives estimates of volatilities and correlations of markets and prices derived from historical volatilities
	• for linear relationships between the position value and changes in rates and prices
	• advantage: computational efficient
	• disadvantage: not reliable in non-normal and unstable markets.
	(b) Full Valuation method
⇒ Functional relationship between the position value and changes in rates and prices	• non-parametric
	• based on simulations of extrapolated scenarios, for non-linear relationships between the position value and changes in rates and prices
(a) linear changes of a position value with changes in rates and prices	• advantage: can handle non-linear positions
• analysis tool = sensitivity analyses	• disadvantages: computationally demanding, the scenario generation can be hazardous.
(b) non-linear changes	
• analysis tool = simulations	

unreliable and the danger of a market collapse or sharp unexpected movements in rates should be taken into account explicitly. This can be done best with the help of scenarios.[17] With regard to the functional aspect the value of a position can be calculated by means of sensitivity analyses if it is approximately changing in a linear way with changes in rates and prices. However, for changes in non-linear positions containing options simulations are a more effective tool.

So far, in many aspects the RiskMetrics concept itself falls short of what ideally should be done. And, it is of course only one possible approach to Valueat-Risk analysis. Others may prefer a more subjective approach based on scenarios, calculating implied volatilities from exchange-traded instruments, choosing GARCH-type models for estimations or trying other modifications.[18] Some firms use stress tests instead, or in addition, look at the effects of extreme market movements on a trading book. Stress tests calculate the possible extent of exposures under extreme, i.e. unlikely, assumptions in contrast to the likely losses studied elsewhere. Some consider the most risky plausible scenario, others use a move of four standard deviations for each variable in a VAR model as stress test or other variants. Sometimes, volatility changes are modelled separately and then used as input to options pricing models (compare Jackson 1995:181–2).

Value at risk is but one concept of risk management which has its drawbacks as well. Above all, critics hint at two points (compare Iskandar 1996, Jones 1996). First, being merely a statistical measure, interpreting a VAR figure requires a full knowledge of the method and the assumptions behind it and may not be understood by senior managers with the consequence that some risks may go unnoticed in many firms. Second, in concentrating on market risk, the concept captures only a small part of the dangers firms are facing today. For example, it does not cover volatility in fees and commissions which nowadays represent a major income component for banks (Parsley 1996:75). And, it does not take into account the risk that linkages between markets break down and the assumptions of the underlying pricing models become invalid. The last point requires a closer look.

MARKET LINKAGES AND OPERATIONAL RISKS

A key assumption in risk analysis concerns the relation between risks and returns and the way in which different financial instruments and market segments are related to one another. Modern portfolio theory, on which risk management is grounded, assumes that, within limits, there is a trade-off between risks and returns and some risks compensate one another echoing the old wisdom of 'not putting all of ones eggs in one basket', with the 'eggs' being the number of financial instruments and the 'basket' an investor's portfolio. An efficient portfolio is one that maximises an investor's return at a certain risk level or minimises his risk for a chosen level of return over a broad range of available financial instruments.[19]

Along this line of argument diversification pays as long as returns are not perfectly positively correlated. On the other hand, some risks can be hedged away by simply buying an instrument whose return is perfectly negatively correlated to the first one. This is the idea behind the development of derivatives instruments. However, this does not hold for all risks and instruments. The theory distinguishes between systematic and unsystematic risk. While the latter is only determined by variations in an assets expected return systematic risk is the responsiveness to general market movements which is the same for all instruments in this market. In today's world of widely connected and interdependent international financial markets the possibilities have grown to limit systematic risks as well. But the respective relations are not stable.

Taking a look at financial markets worldwide, at times, there is a substantial variation in correlations between them. For example, during the crash in world stock exchanges in October 1987 major markets were moving all in the same direction and became nearly perfectly positively correlated. On that occasion, diversification between them would not have been of much help in reducing risk, instead hedging, or having long and short positions in different markets, would have proved beneficial. At other times, correlations were found to be closer to zero or even negative. One example is the Nikkei index which fell alone after the general 1987 crash. In such cases, diversification is very useful, but there are fewer benefits from hedging (Jackson 1995:181).

In general, rules of hedging and diversification assume that markets are liquid and constantly well functioning with prices being quoted all the time. None of this needs to hold in periods of turbulence and stress. An often cited example took place in September 1992 when the situation became extremely difficult for investors in the market for European currency options. During the crisis of the European Monetary System cross-currency options had been bought at rates at or outside the limits of the band within which currencies were allowed to fluctuate under the Exchange Rate Mechanism. As long as they expected the band to hold option writers did not think of hedging their positions. But, when in the course of the crisis uncertainty grew they rushed to limit the damage and close their positions which put additional pressures on the weaker currencies within the system. Suddenly, volatility became much stronger than assumed in options pricing models making the valuation and hedging of positions extremely difficult. Worse, liquidity dried up or disappeared in several markets.

Examples of near breakdown of derivatives markets are not limited to Europe. For instance, calculations comparing US and Japanese exchanges during the events in August 1990, when Iraq invaded Kuwait, showed that the average daily time futures on the Nikkei index and on the Standard and Poors (S&P) index were not available for trading was 2.7 minutes for the S&P compared to 60.2 for the Nikkei during that month. Thus, in those days, 'the Nikkei was locked and untradable for an average of an hour a day' (Walmsley 1996:172). Incalculable events like the outbreak of a currency crisis or a military conflict

are among the reasons why, recently, in a sense attention shifted away from market risk to the sources of market stress and turbulence and to a broad category of eventualities not covered by traditional risk analyses which are summarised under the term 'operational risk'. Broadly defined, operational risk is any risk of earnings volatility that is not market or credit related. The list ranges from product liability risk over the risk of fire and explosion as well as business interruption risks of any kind to directors' liability, technology risk and many more (Parsley 1996:74). For example, it was operational risk, and not credit or market risk, which was responsible for the business losses of Daiwa Bank in 1995 and the Sumitomo Corporation in 1996.

In September 1995, Daiwa Bank announced accumulated losses of $1.1 billion from the activities of a bond trader of its New York branch, Toshihide Iguchi, which he had managed to hide over a period of 11 years.[20] Mr Iguchi, a former car dealer who was with the Bank since 1976, became manager of its New York branch's trading operations in 1979. In 1984, he lost $200,000 in betting on US-government bonds. Instead of confessing the losses he went on with his unauthorised activities and began to use customers' accounts and forge documents to cover them up. The losses which grew over the years went unnoticed despite the fact that Japan's bank regulators as well as the Federal Reserve Bank of New York and the New York State banking authority examined the branch's operations. In the end, they only became known because the dealer confessed.

The Sumitomo case is more complex. On 13 June 1996, Sumitomo Corporation, the big Japanese general trading house, announced that its chief copper trader, Yasuo Hamanaka, had been running up estimated losses of $1.8 billion in unauthorised trades at the London Metal Exchange (LME).[21] Mr Hamanaka, who had joined Sumitomo in 1970 and, in contrast to many other Japanese who are subject to the system of job rotation, specialised very early in copper trading, became known in the metal markets as 'Mr Copper' due to his control of international copper stocks and the sheer size of his trades. Most of his career he was working with the support of his superiors, enjoying all privileges a core company of a Japanese *keiretsu* has in the markets with the groups financial weight thrown behind his dealings. But, when his losses became known, he became just another 'rogue trader' over whom a firm had lost control.[22]

According to traders' estimates, in June 1996, Sumitomo had more than two million tonnes of copper to sell, or about 20 per cent of the total used in the Western world every year. As soon as the first rumours about Sumitomo's losses circulated, the copper market provided another demonstration of the threats of options trading both to the banks dealing in those instruments and to market stability.

Typically, copper derivatives are traded by producers who buy put options to hedge themselves against falling copper prices from investment banks such as Bankers Trust, Goldman Sachs, JP Morgan, Lehman Brothers and Merrill Lynch. Those options give them the right to sell copper at a set price.

When in early June the price of copper fell it soon reached a level at which the put options could be exercised and the likelihood of banks facing claims from clients rose. To protect themselves the banks turned to delta-hedging and tried to sell copper futures to establish short positions which gained with a falling copper price. However, by doing so they accentuated the market's volatility and became trapped in a vicious circle.

When risk models told derivatives dealers that they had to sell contracts for about 500,000 tonnes for every $ 100 drop in the price, they drove the price into a free fall. On one day, it fell from $2,247 to $1,910 a tonne within two hours. It was the classical example of a 'gap risk'. Market liquidity dried up and delta hedging became impossible. For instance, dealers were trying to sell at $2,050 but could only do so at $ 1,900. Some of the banks were said to have suffered losses in the order of $10 million on this occasion.[23]

In principle, the problem addressed in both the Daiwa and the Sumitomo case is twofold: on the one hand there are the derivatives markets with their high leverage promising enormous profits and, on the other hand, there are traders with exceptional abilities whose activities remain widely uncontrolled over years. In this respect, there are also similarities to the Barings débâcle. In February 1995, only months before the Daiwa Bank announced its losses, Barings Bank, one of the oldest British merchant banks, went bankrupt after one of its traders at Baring Futures (Singapore) Ltd, Nick Leeson, lost about ¥850 million on the Singapore and Osaka futures exchanges.[24]

There are several linkages to Japan in this case. Above all, the losses stemmed mostly from positions in Nikkei 225 futures, and the event that sealed Barings' fate was the Kobe earthquake in January 1995 which made price volatility move against the trader's odds. According to the Japanese Ministry of Finance, Barings had deposited between ¥70 billion and ¥80 billion with the Osaka and Singapore futures exchanges to cover margin payments, and a large part of this sum was lent by Japanese banks (compare Gapper *et al.* 1995). The Nihon Keizai Shimbun reported after the collapse that 15 Japanese banks had a total of ¥67.7 billion non-performing assets in Baring Securities (Japan). The largest creditor among these was Sakura Bank with ¥10.53 billion followed by Yasuda Trust and Banking Co with ¥10 billion, Sanwa Bank with ¥8.5 billion and the Bank of Tokyo with ¥6 billion. Other institutions involved were Mitsubishi Trust and Banking Corporation, Mitsubishi Bank, Sumitomo Bank, Dai-Ichi Kangyo Bank, Tokai Bank, the Industrial Bank of Japan and Fuji Bank (Baker, G. 1995b).

One of the main difficulties after the collapse was to find a buyer for Barings which was complicated by the fact that the open futures positions would have to be closed out and that while all parties concerned were searching for a solution the exposure was rising all the time. The first idea was to find some outsider who would be willing to cap the liabilities and take them at a price. Among the most likely candidates were Japanese financial institutions with their huge holdings of Japanese stocks. They had an interest

in avoiding a fall of the Nikkei index which was feared would be triggered by the liquidation of Barings' portfolio. But, when the Bank of England approached the Bank of Japan for this purpose, the Japanese Ministry of Finance who made the ultimate decision made it clear that local law prevented off-exchange dealing in quoted financial futures.[25]

Under risk considerations one of the main weaknesses of the firms in the Barings débâcle and other cases was that control and dealing functions were not separated properly. As manager of trading operations the Daiwa dealer was overseeing, among other things, the auditing of his own trades and, in principle, the same holds for Nick Leeson who had a licence for trading on the Singapore International Monetary Exchange (SIMEX) and was in charge of the settlements and accounting department of Baring Futures at the same time.

Partly in reaction to reported losses in derivatives trading, Japan's big securities firms began to step up their risk management systems. Nomura had already introduced a Value-at-Risk concept in July 1994. Now Yamaichi, Nikko and Daiwa Securities reconsidered their risk management practices. From February to March 1995 Yamaichi had an examination and revaluation of its in-house rules for derivatives trading. Nikko Securities unified its sections for credit and market risk at the beginning of March 1995 to get a clearer picture of how much capital the firm has at risk and Daiwa Securities announced a similar step for the end of the same month (Ogawa 1995b).

As another consequence of the Barings débâcle international derivatives exchanges and their regulators began to exchange information on the exposure of their common members to excessive risks in different markets (see Lapper 1996a). During the Barings crisis while losses were mounting up in Singapore and Japan one of the most disturbing facts for observers in retrospect was that there had been absolutely no communication between the exchanges of both countries and contact between the exchanges and Barings were poor as well. For example, nobody at SIMEX contacted the Osaka Exchange to verify that Barings' Singapore contracts were hedged in Osaka as the Barings trader pretended, a step which might well have saved the bank.

Rivalry was given as the main explanation. Despite the fact that similar contracts are traded on both exchanges, Osaka officials met their SIMEX counterparts only three times in seven years. They are not an exception. Communication between exchanges worldwide has traditionally been poor (Rawnsley 1996:205–6). But, they have learned their lesson from Barings. In March 1996 some fifty international exchanges and clearing houses agreed to inform one another if common members appear to be building up risky or potentially excessive exposures. In addition, fourteen regulators have signed a backup agreement which insures that information is traded even when exchanges are prevented from fully cooperating by legal constraints or other considerations.

However, unreliable traders and loose controls are but two factors in a broad range of operational risks. In general, those risks can be distinguished in two main categories: operations risk and business event risk (Table 6.3). The first is

Table 6.3 Sources of operational risk

Operations risk	*Business event risk*
Transaction risk • execution error • product complexity • booking error • settlement error • commodity delivery risk • documentation/contract risk	Currency convertibility risk
	Shift in credit rating
Operational control risk • exceeding limits • rogue trading • fraud • money laundering • security risk • key personnel risk • processing risk	
	Reputation risk
Systems risk • programming error • model/methodology error • mark-to-market error • management information • IT systems failure • telecommunications failure • contingency planning	
	Taxation risk Legal risk Disaster risk • natural disasters • war • collapse/suspension of markets Regulatory risk • breaching capital requirements • regulatory changes

Source: Parsley (1996:76)

normally considered easier to model and evaluate than the second. It comprises transaction risks such as execution, booking or settlement errors as well as operational control risks (this includes cases such as the 'rogue traders' at Barings, Daiwa Bank and Sumitomo) and systems risks from programming errors, telecommunications failures and the like. The second class covers a broad spectrum of other events that may happen to most businesses in their day-to-day operations such as changes in reputation and credit rating, the legal or institutional environment or natural disasters and a collapse or suspension of markets.

Operational risk is looming in many areas of financial business. Top on the list of activities which nowadays appear particularly exposed to those kinds of risk are international project finance, lending to emerging markets and involvement in organised crime (see also Caplen 1996). In general, Japanese institutions are not immune to these risks.

With regard to international project finance and lending to emerging markets, many of Japan's activities naturally focus on east Asia. In recent years, Japanese general trading companies have been strongly building joint ventures across the region. For example, in the second half of the 1990s, Itochu doubled its joint ventures in Asia to 350, of which 180 are in China. Japans financial institutions are financing large projects. One of the fields firms engage in are infrastructure projects since, like other investors in emerging markets, they have found obstacles such as poor distribution and erratic power to hamper their prospects. Another kind of activity which is favoured by the general trading companies is build-operate-transfer, a technique which had been successfully tried earlier by industrial and construction companies in Africa and Latin America. It consists of building a plant or a road, retaining the right to operate it for several years and then transfering it to the host country at the end of the contract period. These and other activities bear particular risks for the investor since governments can easily be replaced during the life of a project by less reliable ones and some countries lack the legal framework to guarantee complex contracts.[26]

A second source of risk in the region is that Asian countries are borrowing heavily from Japan to finance their economic expansion. The main borrowers here are China, Indonesia, Malaysia, the Philippines and Thailand. Funds coming from commercial banks are still mostly denominated in US dollars. But an increasing share is borrowed from official Japanese lenders and they insist their financing is conducted in Japanese currency which due to the yen appreciation in the first half of the 1990 imposes severe strains on the system. Between 1985 and 1993 the total debt of the five countries mentioned owed to official lenders in Japan doubled to nearly ¥7,000 billion. The share of yen loans in total debt within ten years rose from 27 per cent to more than 35 per cent. As a result, the countries' debt service costs increased considerably in line with the appreciation of the yen and, in some cases, the combined effect of the higher borrowing and the stronger yen has been to increase debt service costs in yen more than fivefold in less than ten years (Baker, G. 1995a).

The risks for the banks in this case are high. Meanwhile, Japan's financial institutions are seriously worrying about a Mexican-style debt crisis in the region. But, the dangers are not limited to east Asia. A general problem worldwide is that more and more emerging economies are financing large current-account deficits with short-term borrowings. There are two aspects. First, although observers hint at the fact that in contrast to the international debt crisis of the 1980s most of the lending banks are better capitalised nowadays this does not necessarily hold for Japanese institutions. On average, their capital/asset ratios are still much lower than those of banks in other G7 countries.

Second, banks' derivatives positions on emerging market instruments which have grown strongly in recent years have become an additional risk element. The markets for those instruments are typically illiquid, volatile and lacking in transparency. Over-the-counter trades dominate, of which local governments and economic policy makers are often unaware. An additional problem in this context is the packaging of direct investments for portfolio investors. For the governments these look like long-term direct investment. In reality, they are short-term flows which can be withdrawn easily rendering the economies of those countries most exposed to capital flight (Caplen 1996:56).

A wholly different kind of operational risk stems from an involvement of financial institutions in organised crime. For Western banks it is the effects of international money laundering or the extortions by computer hackers from the Russian mafia which impose the biggest threats in this area.[27] For Japanese institutions it is Japan's version of organised crime gangs, the *yakuza,* which are a big problem. As the banking crisis of the 1990s demonstrated, the *yakuza* have a wide-reaching influence on the Japanese economy and turned out to be deeply involved in both the origins of the crisis and the failure to solve it. One of their most profitable lines of business in this context is real-estate occupation which has become a 'multi-billion dollar fund raiser' in recent years.

During the height of the speculative bubble in Japan apartment buildings and offices in big cities such as Tokyo and Osaka had served as collateral for loans from banks and other financial institutions by which they were financed. After the burst of the bubble, the worth of the land they were built on declined and many real estate developers went bankrupt. Normally, in this case the buildings would be auctioned and the money raised returned to the lender. But, in practice, this was often made impossible by members of the *yakuza* who profit from the financial crisis in their own way. They gather information about bankrupt companies and the property they own. Then they pick a target and take out a lease on an office or appartment in one of its buildings and move in. When the company files for bankruptcy the *yakuza* members declare themselves with the result that any attempt to auction the building becomes extremely difficult. The bank or finance company that owns the mortgage is left with two choices: either to go through Japan's complex legal eviction process which may take years, or to sell the building far under value with the *yakuza* organisation itself often the only potential buyer. In 1995, there were estimates that up to ten per cent of Japans bad debt collateral at that time, or a value of at least $30 billion, was affected by gang activities (Baker 1996b).

However, the relations between financial institutions and organised crime in Japan are more complex than these cases show, and it is not always easy to tell the victims from the criminals. For example, there are allegedly strong ties between the big securities firms and the *yakuza* (compare Reading 1993:129, 278–9) who are not only sometimes regarded as useful allies in handling debt collection for stockbrokers but are also powerful customers who need

to be placated, or even compensated, when stock prices fall. Those and similar ties make firms vulnerable in more than one way.

Banks have just begun to develop methods to cope with operational risks. Many of their experts consider dealing with this kind of risk simply a question of common sense and of reducing opportunities for things to go wrong (Iskandar 1996). For example, with respect to the danger of 'rogue traders', measures include the separation of responsibilities between traders and back office staff, or increases in controls and random checks. But, business and event risks are much more difficult to handle. One way to deal with them is to try to imitate those who are expert at handling rare but devastating losses, the insurance companies. For example, this can mean applying basic probability theory to come to a 'best guess' margin error around a mean and then use historical data and the best guess to determine an expected level of losses. However, beside all imponderabilities, this would require strong investment in an external data base of operational loss events. Another possibility is to directly look for insurance cover instead. Some insurance companies are reported already to offer reciprocal policies, albeit mostly for settlements and payments risks, which will be discussed in the next chapter.[28]

Some financial markets are better equipped to cope with operational risks and very low probability events than others. In foreign exchange, for example, the amount of risk the market can absorb at one time appears to have declined massively in recent years. Although market turnover has risen liquidity is widely considered no longer sufficient to guarantee institutions that get into trouble and need to sell large amounts of currency quickly that they can do so without moving prices against them (*The Economist* 1996d).

There are several explanations for this situation. The first is the growing market share of electronic brokers. They have become popular among other reasons because they allow small banks to deal directly with each other instead of channelling trades through larger banks. This means on the other hand that the large banks find it harder to use streams of small orders for timing their big trades and to shift large positions undetected. Second, electronic broking has made the market more transparent since their trades are published immediately. But, the more information banks have about prices, the greater are the difficulties for firms to execute big trades without moving prices against them. A third explanation for the decline of liquidity is derivatives trading and here, in particular, the growing use of currency options. As has been argued earlier, they can produce sharp swings in prices which, at least temporarily, may result in illiquidity.

In addition, some market participants are better prepared than others to deal with operational risks. However, this does not necessarily hold for Japanese institutions whose performance in this respect is much worse than that of their main competitors from other countries. For example, comparing the average return on equity of Japan's commercial banks with that of US or German banks shows that, after a massive decline in recent years, their

Table 6.4 Return on equity (ROE) and capital/asset ratios of commercial banks*

Country	*1991*	*1992*	*1993*	*1994*
United States				
• number of banks	12,269	11,689	11,242	10,741
• ROE	9.90	16.77	20.62	22.18
• capital/asset ratio	6.67	7.18	7.85	7.88
Germany				
• number of banks	339	329	300	294
• ROE	8.56	10.15	13.09	12.76
• capital/asset ratio	8.67	8.21	7.54	7.56
Japan				
• number of banks	143	141	140	140
• ROE	7.91	6.24	4.14	2.52
• capital/asset ratio	4.12	4.42	4.73	4.87

* In per cent. For Germany, figures for 1993 and thereafter are based on reunified Germany.
Source: Bank of Japan (1996c: Table 34)

profitability is extremely low (Table 6.4). The same holds for their capital/asset ratio. All this makes them appear ill-equipped to digest a major shock.

One most terrifying, and at the same time most popular, scenario conjured up for Japan is that of a big earthquake hitting the Kansai region.[29] According to a common line of argument this would not only severely hurt Japanese financial institutions directly by the damage done to banks' and exchanges' buildings and operating systems and the like. The resulting domestic demand for funds for reconstruction as well as for payments the insurance industry in Japan would have to make would lead to a massive capital outflow from foreign countries with the threat of a major crash in international bond and stock markets, above all in the United States, rising interest rates in the G7 countries and a crisis of the financial system worldwide.

The Kobe earthquake in January 1995 reminded the financial community that the threat is real. But it also demonstrated that the financial risks of a major shock need not be as expected, and, above all, need not materialise in the country of origin. Looking at the devastations in the Hanshin area who would have thought that one of the greatest dangers for the international financial system in this situation would come from a 28-year-old trader in Singapore who, at that moment, in the course of ruining a British bank at the other end of the world was on the brink of triggering a chain reaction across markets worldwide? In this sense, Kobe, too, may serve as a reminder for the financial community of its worst nightmare so far, which is payment system risk.

7

PAYMENT SYSTEM RISKS

When Barings Brothers collapsed at the end of February 1995 one of the immediate effects, widely unnoticed by the public, was the problem emerging in the ECU clearing system which threatened to block the settlement of ECU50 billion of payments, although Barings itself was involved in less than one per cent of those payments.[1] On Friday, 24 February, a clearing bank had sent a payment order of a comparably small amount in ECUs to the Baring correspondent with value date Monday, 27 February. When the disaster became known on Saturday, the clearing bank which tried to cancel the order learnt that this was not possible under the rules of ECU-Clearing.[2] On the other hand, the receiving bank was not allowed to reverse the transaction either. Thus, at the end of the day the clearing bank had a net liability which threatened to block the clearing of all forty-five banks participating in the system. Under the pressure of time the bank agreed to cover the position by taking a loan from a bank with a net selling position. Otherwise settlement at the end of the day would have become impossible, clearing between all banks would have had to be cancelled and no payments whatsoever would have been settled between the forty-five institutions on that day. The situation would have become extremely difficult, not only for the banks but also for their clients in the ECU markets and beyond.

This is a classic example of systemic risk. A minor temporary failure to obtain funds can lead to losses for a large number of banks thereby triggering a chain reaction which threatens the stability of financial markets all over the world. Barings was not the only case. In February 1990, Drexel Burnham Lambert (DBL) broke down under massive liquidity problems and the Bank of England stepped in as honest broker to settle the trades of one of its subsidiaries which had been engaged in proprietary trading in the foreign exchange and gold markets. When the true extent of the group's problems became known counterparts became more and more hesitant to take intra-day risks in settling the foreign exchange transactions and, on the other hand, the DBL subsidiary began to hold back payments fearing that the other sides would not fulfil their obligations but set the amounts received against outstanding liabilities of other group members. It took the Bank of England one full week to overcome the bottlenecks and sort out the trades.

When in August 1990 during the invasion of Kuwait fears about the survival of Kuwaiti banks and the dinar threatened gridlock, it was again the prompt reaction of central banks which prevented the worst from happening. Payments were also hindered and delayed during the attempted coup in the Soviet Union in August 1991 when, for example, correspondent banks of Soviet banks refused to release funds to settle foreign exchange contracts even though they had received the countervalue or asked for guarantees before paying out the respective amounts.

A Japanese bank was directly involved in still another case, the collapse of the Bank of Credit and Commerce International (BCCI) in 1991. The bank lost a large amount in a US dollar/yen trade which was due on 5 July, the day the US authorities froze the assets of BCCI SA in New York. At that time, the yen amount had already been paid to BCCI SA in Tokyo via the Japanese yen clearing system. However, the Japanese were not the only ones experiencing heavy foreign exchange losses in this situation. One London bank on 5 July 1991 made a payment in pound sterling as one leg of a US dollar/pound trade agreed two days earlier with BCCI SA London. On 4 July, which was a public holiday in the United States, the BCCI had ordered its New York correspondent to pay out the dollar with value date 5 July. A bilateral credit limit of the receiving bank in the CHIPS system against the BCCI's correspondent was the reason why this order was not transacted immediately but stayed in the pipeline until afternoon. Then, at 4 p.m. New York time, when the BCCI's assets were frozen, the BCCI's correspondent cancelled the order and the counterpart lost the money.

These and other examples demonstrate the key elements of payment system risks.[3] In principle, each transaction leading to a payment is based on a contract calling for some form of exchange between the two parties with one leg being the payment itself and the other the delivery of the good or service or the transfer of ownership of a financial asset with risks involved for both counterparties as well as for any intermediaries taking part in the payment or delivery leg. In a foreign exchange transaction, funds denominated in different currencies are exchanged.

Most large-value interbank payments and settlements systems worldwide operate on the basis of netting. The systems are constantly keeping track of the net position of banks which are sending thousands of payment instructions (but no cash) to each other in the course of the day. At the end of the day the net amounts owed are settled by means of transfers between the participants' accounts at the central bank, if the payment system is a public one, or at the clearing house, if the system is privately run. With the spectacular growth of foreign exchange trading in recent years settlement has increasingly brought into contact otherwise largely separated domestic payment systems thereby adding an international dimension to the problem which arises from far distances and differences in time zones as well as differences in countries' operating, regulatory and legal arrangements (Borio and Van den Bergh 1993:7).

In principle, there are two main sources of payment system risks. The first is any lag between the time a trade takes place and each of the two legs is performed, which is the *settlement lag*. The second is any lag between the completion of the two legs, i.e. *asynchronous settlement*. Both can give rise to two fundamental types of risk: credit and liquidity risk. The first is the risk of loss on outstanding claims on participants in the transaction, the second is the risk that settlement will not be made at the time due resulting in a cash-flow shortfall. As far as relatively expensive borrowing, unprofitable asset sales, induced defaults on other contracts or even bankruptcy are the result, the latter bears an induced credit risk as well.

Payment system risk is often also called Herstatt risk, referring to a case of asynchronous settlement which happened in 1974. On 26 July, Bankhaus Herstatt in Cologne, a small German bank which was very active in foreign exchange dealing, was closed by the Bundesaufsichtsamt für das Kreditwesen, the German banking supervisory authorities.[4] The closure was announced in the early afternoon, German time, after the settlement of same-day interbank systems in Germany had taken place, and several of the banks counterparties from the United States and elsewhere had payed out D-mark to Herstatt to meet their obligations from D-mark/dollar trades. Although payment for the transaction of the dollar legs had already been ordered by Herstatt s correspondent bank in New York, where it was still late morning, the failure of the bank prevented the completion because it was shut before the New York settlement system had opened leaving foreign exchange trades of over $620 million worth undone. The markets were close to panic despite the fact that the typical exposures involved were much smaller than they are nowadays. In the end, partial compensation for the losses was made, but general confidence was shaken.

Herstatt risk arises mainly due to the difference in time zones and working hours of banking systems across countries. Typically, settlement of the two legs of a foreign exchange trade takes place in the country of issue of the respective currency and, until very recently, there has been no overlap at all between the operating hours of the large-value interbank funds transfer systems of the United States, Japan and Germany, which are the countries with the most actively traded currencies worldwide. The lag can be particularly long for yen/dollar trades. For example, when transacted through the Foreign Exchange Yen Clearing System (FEYCS) and the Clearing House Interbank Payments System (CHIPS) the party delivering the yen would have to wait at least seventeen hours after having payed out the funds before it would receive the dollars. Based on the opening hours of the BOJ-NET and Fedwire, until recently, the shortest lag would have been seven and a half hours (Borio and Van den Bergh 1993:56–7). In the meantime, there have been efforts to shorten these spans. For example, the US Federal Reserve has begun to extend considerably the opening hours of Fedwire (*The Economist* 1996e).

Recent studies have shown that payment system risks are far greater than previously thought. With an estimated daily turnover in foreign exchange

markets worldwide of over $1.2 trillion and two or more payments involved in each trade settlement, flows are likely to be a multiple of the turnover figure. There is a strong market concentration: there are an estimated thirty to forty banks in the world which are internationally active in a narrow sense which means that they are making two way prices in multiple currency pairs in usually more than one trading centre. Those banks deal in any amount and in most market conditions. Some of them routinely settle trades worth more than $ 1 billion with a single trading partner on a single day with the resulting risk amplified by the fact that they can build up as much as three days exposure by sending irrevocable payment orders to national payment systems before settlement. Up to 80 per cent of their total exposure is estimated to be concentrated in about fifty counterpart banks. In London, the top ten banks account for more than 40 per cent of turnover (compare Bartko 1996, Gawith 1996).

Many institutions appear unaware of the risks they run. Payments and settlements are still largely regarded as an administrative matter for the back office and not for the board room. The whole issue tends to be viewed as 'Cinderella risk' and there is widespread scepticism about devoting significant resources to protecting against it. Many banks believe that the probability of losses on foreign exchange trades is far smaller than the risk from their loan exposure. Many lack clear internal lines as well as the authority structures or incentives to address the issue. Foreign exchange settlement exposures are widely considered as an intra-day problem ignoring the fact that the gap between the moment the trade is agreed on and the time the bank knows for certain that it is completed can be up to three days, for certain transactions in yen, due to peculiarities of the Japanese yen settlement system, and still longer if holidays and weekends are counted. Most foreign exchange transactions settle two business days after the trade date.[5] For yen settlement the span can be wider because members of the Foreign Exchange Yen Clearing System (FEYCS) can make irrevocable orders for yen payments up to three days before settlement. The problem is aggravated by the fact that, as recent studies have shown, it often takes banks another one or two business days before they ultimately know that the trade has been completed at the time due.

Another risk element is that many banks do not know the modalities of payment systems and, as the Barings case demonstrated, are not aware at which point in time their orders become irrevocable and at which moment a trade can be considered as truly completed. In addition, most seem to rely on the assumption that major banks trading in the market are 'too big to fail' and that the authorities will deal with those kinds of problems, a view supported by the central banks' successful handling of cases in recent years. Another view is that the authorities will not close a major bank during the business day, disregarding the fact that on such a day there is no single point in time when the large-value systems for all major currencies are closed which may leave the authorities with few choices.

MAJOR PAYMENT SYSTEMS

The central banks and national settlement systems of major industrial countries are the first involved in case of failure. There are estimates that foreign exchange settlement account for 50 per cent of all daily transactions of the Clearing House Automated Payment System (CHAPS) in the United Kingdom and CHIPS in the United States and even for 80 per cent in the German Elektronische Abrechnung Frankfurt (EAF). Simulations carried out for CHIPS in the mid-1980s showed that the unexpected failure of one major market participant could result in nearly half of all participants being unable to settle trades with as much as one-third of the total value of transfers affected. Moreover, the simulations revealed that, in principle, it is not possible to predict which institutions would be involved. Because of the knock-on effect, even banks without direct dealings or with a net debit position *vis-à-vis* the failing institute can become unable to meet their obligations (see Bank for International Settlements 1994:180). How far the central banks' involvement in payment system risk can go was demonstrated in November 1985 when the New York Federal Reserve lent $23 billion (more than 20 times the banks capital) to the Bank of New York after a computer incident there had caused it to run up a daylight overdraft of almost $30 billion (*The Economist* 1996e).

Although most large-value interbank funds transfer systems worldwide operate along the same broad principles there are still many structural differences between them (compare Borio and Van den Bergh 1993:10–18). In some countries they are managed directly by the central bank, in others they are privately run and the clearing house may or may not have an independent legal identity. However, all of them settle on the books of the central bank. Most systems handle transfers related to both commercial and financial transactions with the latter accounting for the bulk of activities in value terms, but some have been designed specifically to support payments related to international transactions.

Traditionally, large-value interbank funds transfer systems are clearing or net settlement systems with payments settled at discrete time intervals. Their biggest advantage is that they keep the need for settlement balances and operating costs low, as well as the number and size of portfolio adjustments banks have to make. In 1993, the reduction in settlement flows reached through netting was about 99 per cent of the underlying gross transfers for CHIPS, 98 per cent for CHAPS and 89 per cent for the Japanese FEYCS (see Bank for International Settlements 1994:179). The main drawback of these systems is the described accumulation of commitments to transfer funds over time and the related risks. The alternative is continuous or real-time gross settlement (RTGS) which is, at least for some financial transactions, in operation in most G10 countries.

There are a number of variants of RTGS systems but common to all of them is that funds transfers are settled individually as soon as the corresponding orders are sent provided that the sending bank has sufficient cover in its

account with the central bank (see also Bank for International Settlements 1994:176–82). As a result, the individual transfer becomes unconditional and irrevocable. Intraday finality, which is the certainly that transactions will not be unwound if a bank fails to settle, becomes possible and the uncertainty surrounding unwinding positions is eliminated. The main disadvantage is the liquidity constraint implied by RTGS systems. For central banks, there is a conflict: there should be enough intra-day credit available to banks to smooth payment flows, but it should not be so cheap that it encourages the banks to take big risks (*The Economist* 1996e: 18).

In most G10 countries two or more large-value funds transfer systems coexist. In some of them, systems settle on a net basis at different times during the day without any links between their settlement procedures. In other countries, the multilateral balances due for payment in net settlement systems are finally settled through a RTGS system (Borio and Van den Bergh 1993:18). Another difference refers to the number of banks participating in a system. It depends on the structure of the local banking industry as well as on the system s specialisation. For example, for systems designed predominantly for foreign exchange related transfers it is comparably low. There are systems with a tiered structure with a small core of banks settling on the central bank s books which act as correspondents and settlement agents for the other participants. In some cases, non-banks such as securities firms and other financial intermediaries, government entities and non-financial corporations participate as well (Borio and Van den Bergh 1993:13).

Tables 7.1 and 7.2 show some characteristics of large-value interbank funds transfer systems in major industrial countries.[6] In the United States, the system operated by the Federal Reserve is the Federal Reserve Wire Network, or Fedwire. This is a private network for transfers between financial institutions with accounts at the Federal Reserve Bank. Payments are settled on a real-time gross basis. The large number of participants reflects the federal structure of the US banking system. Among its 11,435 member banks in 1989 were 37 nonbank participants which were government entities (Borio and Van den Bergh 1993:16–17, Table 3). Founded in 1914, Fedwire was computerised in the early 1970s and modified in 1982. With the start of its working hours shifted to 12.30 p.m. local time from 1997 onwards, for the first time an overlap exists between a Japanese and a US large-value interbank funds transfer system. Fedwire handles transfers relating to commercial as well as money market, foreign exchange and securities transactions.

A US system specifically designed to support payments related to international transactions is the New York Clearing House CHIPS system. CHIPS stands for Clearing House Interbank Payments System. It is a net settlement system which was set up in 1970 and initially serviced exclusively international payments. During the first years it provided next-day settlement. However, given the huge flow of funds transacted through the system this created considerable credit risk overnight and also caused complications in the eurodollar and foreign exchange markets. Thus, in October 1981 it changed

Table 7.1 National payment systems in international comparison

System	*Fedwire*	*CHIPS*	*CHAPS*	*EAF*	*SAGITTAIRE*
Management	US Federal Reserve System	Private US clearing system	Private UK large-value funds transfer system	Deutsche Bundesbank	Banque de France
Launch date	1914[a]	1970	1984	1990	1984
Number of member banks[b]	about 11,000	122	14 settlement banks, about 400 others	53 direct participants	65 SWIFT members
Underlying transactions[c]	Com, MM, FX, Sec	Com, MM, FX	Com, MM, FX, Sec	Com, MM, FX	Com, MM, FX

a Latest upgrade of the communications system in 1982.
b As of 1992, for EAF 1994.
c Com=commercial, MM=Money market, FX=Foreign exchange and international, Sec=Securities market
Source: Borio and Van den Bergh (1993), Deutsche Bundesbank (1994), Nagahata (1994:59), Sakata (1994:30, Table 1)

to same-day settlement. At first, this imposed severe strains on the Federal Reserve on whose account CHIPS settles. With breakdowns up to two or three times a month the Federal Reserve got used to holding its system open during the day as long as was required to process payments as soon as CHIPS had been restored (compare Walmsley 1983:396).

CHIPS had some painful experiences during the worldwide debt crisis in the early 1980s when on one day, at the height of the crisis, Mexican bank branches ordered their CHIPS representatives, Chemical and Manufacturers Hanover, to pay out $70 million more than they could cover. This brought the system to the brink of collapse since its rules at that time said that if all transactions netted at the end of the day could not be settled, no CHIPS payments would be made at all. Thus, if the two correspondent banks had refused to cover the Mexicans' shortfall all CHIPS transactions would have had to unwind (see Solomon 1995:209). Spectacular cases like this drew attention to the vulnerability of large-value net settlement systems.

CHIPS changed its rules in 1990 and switched to a loss-sharing arrangement. In case of a participants default, each CHIPS member now is required to pay an additional settlement obligation which is calculated according to its maximum exposure to the failed institution on the respective day. Coverage is provided through pre-posting of collateral by each participant equal to its largest potential additional settlement obligation (Borio and Van den Bergh 1993:40). CHIPS handles transfers from all kinds of commodity, money market and foreign exchange transactions. It has a two-tiered structure. Among its 139 participants in 1989

were 118 non-settlement members; 41 were domestically owned and 98 foreign-owned. To limit receiver risk the banks are able to set bilateral credit limits, or net debit caps,[7] which restrict the amount of payments made by any one bank to all other members in excess of the value of all incoming transfers to it.

In the United Kingdom, the Clearing House Automated Payment System (CHAPS) which was established in 1984 is the most widely used system for handling large-value sterling transfers (see Bank of England 1994). It settles transfers on a net basis. It is a two-tiered system with a small group of participants acting as settlement members. An unidentified number of banks and institutions have access to CHAPS as customers. The number of participants in the system is changing frequently. Nearly half of them are foreign-owned although there is only one foreign-owned settlement member. There are no non-bank participants (compare Borio and Van den Bergh 1993:16–17, Table 3). In 1992, it was decided to introduce real-time gross settlement for CHAPS in the mid-1990s. Under the new system, each payment instruction will be settled at the Bank of England before it is sent to the receiving bank.[8] CHAPS handles transfers relating to all kinds of transactions, from commercial to money market as well as foreign exchange and securities transactions.

The Elektronische Abrechnung Frankfurt (EAF) is the larger of two largevalue interbank funds transfer systems in Germany.[9] Founded in 1990 it is operated directly by the Deutsche Bundesbank. The EAF has 53 participants most of which are foreign-owned. Originally established as a net settlement system it has meanwhile entered a second stage, EAF-2, which was launched on 8 March 1996 and is said to combine elements from net and gross settlement.

Settlement in the EAF-2 takes place at different time intervals. There is a first phase of 4¾ hours in the morning during which almost all 20 minute transfers are netted bilaterally with the resulting balances open for use as cover for other payments within the EAF-2. To limit receiver risk during this phase banks are strongly recommended to impose net debit caps. The second phase starts with a first trial of multilateral settlement. If trades cannot be settled, payments which are not covered are singled out, and kept for a second trial, by an algorithm which determines the maximum volume which can be settled in this round given the total of disposable funds. Afterwards, there is a limit of 45 minutes for participants without sufficient cover in their account with the central bank during which they can try to provide the funds needed. Then follows a second settlement round. If, again, balances remain unsettled all payments are not unwound but individual payments are taken out of the settlement process until full cover is reached. Uncovered payment orders are considered as called back and rejected. They can be put either into the other large payment system, the CB Express System, the same day or re-entered into the EAF-2 on the following day (Börsen-Zeitung 1996).

In France, SAGITTAIRE stands for Système Automatique de Gestion Intégré par Télétransmission de Transactions avec Imputation de Règlements Etrangers. It is an electronic interbank payment service operated by the Banque de

France within France. Established in 1984 it is for members and submembers of the Society for Worldwide Interbank Financial Communication (SWIFT) located in France and handles French franc payments only. Its 65 participants are all domestically owned banks. SAGITTAIRE settles transfers relating to commercial and money market as well as foreign exchange and international transactions on a net settlement basis.

In Japan, there are two electronic large-value interbank funds transfer systems (Table 7.2).[10] The Zengin system (Naikoku Kawase Kessai Seido) is a private system established in 1973 and operated by the Domestic Funds Transfer Management Organisation (Naikoku Kawase Un'ei Kiko) to settle payments between Japanese banks. It has a large number of participants and a two-tiered structure with 4,751 out of 4,917 being non-settlement members. There are three foreign-owned members. Until March 1993 the Zengin system had been a next-day settlement system, then it switched to same-day settlement. To limit risk the Zengin centre sets sender net debit caps for each member (compare Bank of Japan 1992:35). In addition, there is a loss-sharing agreement which is backed by pre-posted collateral, and the Bank of Japan 'stands ready to ensure settlement on the understanding that any losses in excess of the posted collateral will subsequently be reimbursed by surviving participants' (Borio and Van den Bergh 1993:40).

A system specifically designed to settle payments related to foreign exchange and euroyen transactions is the Foreign Exchange Yen Settlement System (FEYSS) or Foreign Exchange Yen Clearing System (FEYCS).[11] Founded in October 1980, this is a private clearing system managed by the Tokyo Bankers Association (Tokyo Ginko Kyokai or Toginko).[12] It provides settlement of foreign exchange and other cross-border financial transactions on a net basis. Both Zengin and FEYCS settle through the Bank of Japans BOJ-Net (Nihon Ginko Kin'yu Nettowaku Shisutemu). FEYCS was linked to the BOJ-Net in March 1989.[13] To limit risk in FEYCS banks are able to set bilateral net debit

Table 7.2 Major Japanese payment and settlement systems

System	*Zengin system*	*FEYCS*	*BOJ-NET*
Management	Domestic Funds Transfer Management Organisation	Tokyo Bankers Association	Bank of Japan
Launch date	1973[a]	1980[b]	1988
Number of members[c]	4,914, among which 4,751 non-settlement participants	163	448

a Launch of the Zengin Data Telecommunication System,
b The Foreign Exchange Yen Settlement System (FEYSS) was launched on 24 October 1980 and has been operating through the BOJ-NET since March 1989.
c As end of 1990, for the Zengin system 1989.
Source: Bank of Japan (1991b, 1993c), Borio and Van den Bergh (1993)

caps which, in contrast to the Zengin rules, are optional. In addition, there is a loss-sharing agreement which states that any shortage of liquidity should be absorbed by the banks with a bilateral net balance position *vis-à-vis* the defaulting party in order to avoid unwinding (Borio and Van den Bergh 1993:40). Figure 7.1 shows an example for such a loss sharing procedure.

According to the rule, the loss of the failed institution is divided between other participants of the system in relation to their exposure to this bank. In the example, there are two banks, A and B, with a net balance of 60 and 40 money units respectively *vis-à-vis* the failed X Bank and there is an unsettled amount of 40. After application of the loss-sharing rule, A and B have deducted an amount of 24 and 16 each which corresponds to their respective share of the total. The payments X receives from other banks, in this case C and D, remain unchanged.

Statistics of the Bank for International Settlements show that, at the end of 1990, the FEYCS had 162 members. Among those were 64 foreign banks. A number of domestic and foreign financial institutions and corporations have access to the system as indirect participants (compare Borio and Van den Bergh 1993:16–17, Table 3). The Tokyo Bankers Association distinguishes

Before

		X Bank	
		A Bank	60
		B Bank	40
C Bank	20		
D Bank	40		
	60		100
unsettled	40		

... and after application of the loss-sharing rule

		X Bank	
		A Bank	36
		B Bank	24
C Bank	20		
D Bank	40		
	60		60
unsettled	0		

Source: Sakata (1994: 36, Figure 5).

Figure 7.1 Loss sharing in the FEYCS

between members and quasi-members. The former are members of the Association that settle directly on accounts of the Bank of Japan's head office while the latter are indirectly linked to the system. Both need the approval of the Association's board of directors (Toginko Rijikai). While members do not need any special qualifications quasi-members are expected to have an average of at least 100 payment instructions per day (Sakata 1994:32).

According to the statistics of the Federation of Bankers Associations of Japan (Zenkoku Ginko Kyokai Rengokai), at the end of 1994, FEYCS had 145 members and 115 quasi-members. The former comprised the city banks, most regional banks, the 3 long-term credit banks and 8 trust banks, the latter included among others 86 foreign banks (Table 7.3).

The Foreign Exchange Yen Settlement System was developed to cope with the challenges imposed by the liberalisation of foreign exchange trading and a growing internationalisation of the yen in the 1980s. At the beginning there were only 39 member banks, of which 11 were foreign-owned. Since trades are settled through the BOJ-NET the number of transactions as well as the amounts settled have reached a remarkable extent (Table 7.4). In 1993, the system handled far over six million transactions of ¥5950.6 trillion (about $53.5 trillion). On average, there were 23,000 payments or ¥24.1 trillion ($217 billion) transacted per day. In 1995, the average daily amount had even risen to about ¥35 trillion (Nikkei Online 1996b).

However, transaction values in FEYCS are dwarfed by the transfers made in the BOJ-Net itself. The BOJ-Net is a real-time gross settlement system which is also used for net settlement. It was developed in the first half of the 1980s, during the third stage of computerisation in Japans financial industry, and launched in 1988. By the end of 1990, it had 448 participants among which were 80 foreign banks and 89 securities companies. Participants are allowed to enter funds transfer instructions continuously in which case settlement takes

Table 7.3 FEYCS participants

Participating banks	*Category*	*Number of banks*
Members (145)	City banks	11
	Regional banks	63
	Trust banks	8
	Long-term credit banks	3
	Member banks of the second association of regional banks	60
Quasi-members (115)	Foreign banks	86
	Zenshinren Bank, credit associations	24
	Others*	5

* From the commercial and agricultural sector.
Source: Sakata (1994:38, Table 4)

Table 7.4 The Foreign Exchange Yen Settlement System

Year	*Number of participating banks*	*Transactions*[a]		*Daily averages*[a]	
		Cases	*Amounts*	*Cases*	*Amounts*
1980[b]	39	–	42.8	–	0.9
1981	60	–	430.0	–	1.7
1982	63	–	773.2	–	3.1
1983	70	–	998.1	–	4.0
1984	72	–	1291.6	–	5.1
1985	74	–	1596.8	–	6.4
1986	75	–	2226.9	–	8.9
1987	80	–	3183.8	–	12.7
1988	83	–	3756.9	–	15.1
1989	151	4,384	5105.1	17	20.5
1990	163	6,270	7257.7	25	29.3
1991	167	6,502	6258.3	26	25.3
1992	175	6,118	6208.1	24	25.0
1993	178	6,577	5950.6	26	24.1
1994[c]	260	5,940	5526.7	28	26.8

d Trades settled in thousands of cases, amounts in trillions of yen.
b From October 24 to December 31.
c From January to October, the number of paricipants as of end of November 1994.
Source: Sakata (1994:30, Table 1)

place on the central bank books immediately.[14] In addition, there are several settlement times to which instructions can be designated. There is a 'day's open' at 9 a.m., a 'bill clearing time' at 1 p.m. and an 'end-of-day' at 3 p.m. FEYCS participants can enter payment instructions for same-day settlement between 9 and 1.45 p.m. Orders for next-day settlement as well as instructions concerning credit limits can be entered until 4 p.m. (Sakata 1994:35).

In 1995, the BOJ-NET settled transactions of ¥81,693 trillion (about $868.5 trillion) worth. This was about eleven times the value of payments transacted in FEYCS (Table 7.5). However, the full size of this payment system becomes obvious in international comparison. The value of transactions handled by the BOJ-NET is a multiple of that of other large-value interbank funds transfer systems worldwide. For example, in 1994, its ¥81,401 trillion value of transactions, which was about $796.5 trillion, had to be compared with Fedwire's about $211 trillion and CHIPS' $295 trillion leaving other countries' systems even farther behind (Table 7.6).

To allow for a more accurate comparison the figures can be set in relation to the countries' gross national product (GNP). In 1990, the ratio of the total transaction value of a country's interbank funds transfer systems to GNP was around 80 for the United States, 45 for the United Kingdom, but 115 for Japan, which means that, on the assumption of 250 business days per year, it would take the Japanese systems just over two business days to turn over the

Table 7.5 Transaction values in major Japanese payment systemsa

Year	*BOJ-NET*[b]	*Zengin system*	*FEYCS*
1990	73,740	1,870	7,258
	(+24.3)	(+16.9)	(+42.2)
1991	67,961	1,777	6,258
	(–7.8)	(–5.0)	(–13.8)
1992	71,784	1,725	6,208
	(+5.6)	(–2.9)	(–0.8)
1993	78,589	1,793	5,951
	(+9.5)	(+3.9)	(–4.1)
1994	81,409	1,894	6,647
	(n.a.)	(+5.6)	(+11.7)
1995	81,693	2,067	7,670
	(+0.3)	(9.1)	(+15.4)

a In trillions of yen, annual percentage changes in parentheses.
b Due to a break in the time series, data for 1993 and 1994 are not directly comparable.
Source: Bank of Japan (1996c: 86, Table 31)

Table 7.6 Transaction values in major payment systems worldwide*

Year	*Fedwire*	*CHIPS*	*CHAPS*	*EAF*	*SAGITTAIRE*
1990	199,067	222,108	18,880	24,993	35,393
	(+9.0)	(+16.8)	(+28.1)	(–)	(+55.3)
1991	192,255	217,312	19,050	54,936	43,845
	(–3.4)	(–2.2)	(+0.9)	(+119.8)	(+23.9)
1992	199,175	238,256	20,928	83,023	59,219
	(+3.6)	(+9.6)	(+9.9)	(+51.1)	(+35.1)
1993	207,630	262,256	23,545	129,305	108,750
	(+4.2)	(+10.1)	(+12.5)	(+55.7)	(+83.6)
1994	211,202	295,444	25,053	144,904	110,847
	(+1.7)	(+12.7)	(+6.4)	(+12.1)	(+1.9)

* In billions of national currency, annual percentage changes in parentheses.
Source: Bank of Japan (1996c: 86, Table 31)

value of the country's annual GNP while in the United States this would need about three and in Britain even five and a half days.[15]

Both the volume of transfers handled by Japan's large-value interbank funds transfer systems and the settlement lags due to differences in time zones and working hours of banking systems across countries make the country particularly vulnerable to payment system risk. Therefore, Japanese financial markets should benefit most from intitiatives to cope with those risks.

PRIVATE SECTOR INITIATIVES

Supervisors around the world show a strong preference for private sector solutions to reduce payment system risk.[16] Banks are urged to improve their back office payments processing, correspondent banking arrangements and risk management procedures. Beyond those efforts, recently, institutions worldwide have begun to think about joint strategies to limit payment system risks. Some have started to 'net' trades bilaterally or on a multilateral basis by pooling their trades in a particular currency and cancelling out offsetting ones with settlement at the end of the day. In this way, the volume of transfers can be reduced substantially. For example, a bank which does 3,000 deals a day involving 24 currencies will have to make 3,000 payments and receive 3,000 payments. If all trades could be netted multilaterally, the bank would have a maximum of 24 payments on its books for this particular day.[17]

Given the high concentration in currency markets and the sophisticated risk management systems already in place in some institutions foreign exchange trades appear more suited than other financial activities for this kind of treatment. Major banks in the markets are estimated to achieve already between 50 per cent and 60 per cent reductions in relative payment amounts, and at least 85 per cent reductions in the number of payments processed, by bilateral netting (see Bartko 1996). Since netting has a cumulative effect on all netting counterparties it serves to considerably reduce the risk of the market as a whole.

Netting can be done bilaterally or multilaterally. On a bilateral basis, there are two forms of netting, close-out and novation. In netting-by-novation individual transactions are continuously automatically replaced with a single obligation to make one payment for each currency traded for each value date. This reduces settlement risks by reducing average as well as peak settlement amounts, the number of payments processed and the number of times a payment in a currency in a different time zone becomes due.[18] In contrast, close-out-netting is the right to cancel and liquidate currency obligations in an appropriate way in case of a counterparty's default. So far, if at all, many banks are using only close-out-netting (Graham 1996c).

One early effort to reduce transaction volumes in foreign exchange trading in Japan is the global dollar clearing service that Chase Manhattan Bank has provided in Tokyo for many years. Under this arrangement dollar transactions are netted by the Chase branch in Japan, cleared in Europe when the markets there open, and finally settled and paid later in the day through CHIPS in New York (Bank of Japan 1992:4, Solomon 1995:120). Among Japanese banks netting of foreign exchange trades is still rare. To date, it is mostly limited to Tokyo, to trades with foreign banks and to close-out-netting. The first Japanese bank which established netting-by-novation in Japan, which was with a US bank, was the Bank of Tokyo-Mitsubishi. The banks' main argument against novation netting is computer cost. However, meanwhile, there are several Japanese banks considering introducing novation netting among each other, and some of their foreign branches have tried it outside Japan (Inose 1994a).

One driving force behind efforts to standardise these kinds of private sector solutions is the International Swaps and Derivatives Association (ISDA), an organisation set up in New York in 1984 to reduce credit risks and limit legal uncertainty. In 1992, the ISDA developed a master agreement for multiproduct multicurrency cross-border deals providing for close-out as well as novation netting. The rationale behind a master agreement is to avoid the uncertainties and possible disputes connected with individually drafted contracts. In addition, as the G30 Global Derivatives Study Group emphasised in its recommendations in 1993, a single multiproduct agreement creates the greatest legal certainty that credit exposure will be netted. 'The use of multiple master agreements between two parties introduces the risk of "cherry-picking" among master agreements (rather than individual transactions) and the risk that the right to set off amounts due under different master agreements will be delayed' (Global Derivatives Study Group 1993:16).

Nevertheless, the Group's survey found that, so far, only two-fifths of dealers documented derivatives transactions under a single multiproduct master agreement. Many market participants still prefer separate agreements for different products. One which refers exclusively to spot and forward foreign exchange transactions is the International Foreign Exchange Master Agreement (IFEMA). This is a bilateral netting agreement drawn up under the auspices of the British Bankers' Association and the Foreign Exchange Committee of New York which provides for close-out as well as novation netting. It was introduced in London, New York and Tokyo shortly after the development of an earlier similar master agreement for currency options (ICOM or International Currency Options Market Master Agreement).

In January 1994, the Tokyo Foreign Exchange Market Practices Committee decided to adopt the IFEMA as standard agreement for the Tokyo interbank over-the-counter spot and forward market, and Japan signed the agreement as the third country after the United States and the United Kingdom (Tokyo Foreign Exchange Market Practices Committee 1994). This will enable Japanese banks to reduce considerably settlement risks in foreign exchange and cross-border transactions as soon as they have built up the necessary technical facilities. In March 1996, the British Bankers' Association went one step further and presented another master agreement which, once approved by the national authorities, would allow banks to offset their deposits with each other in case of default whatever the currency (Graham 1996c). Then a contract of $100 million in pounds sterling could serve to offset one of $100 million in yen. The agreement was worked out in close cooperation with the Bank of Japan and a Japanese law firm, as well as with lawyers in other countries, in an effort to ensure the agreement would be legally watertight in the Japanese and other main interbank markets of the world.

Master agreements are but one way to provide for standardised bilateral netting between banks. Another is the automated service offered by private firms. In 1984, Citibank and other big international banks founded FXNET[19]

which nets foreign exchange payments bilaterally between about 30 banks in 16 currencies. In 1990, SWIFT (Society for Worldwide Interbank Financial Communication) created Swift Accord allowing its members to net foreign exchange transactions bilaterally. SWIFT itself is a private international telecommunications service for member banks and qualified participants. It is not a settlement system but provides an international network for a large range of interbank communications including money transfers, letters of credit and many more. SWIFT was founded in 1973 as a cooperative non-profit organisation with headquarters in Brussels. In the beginning, it had 239 member banks from 15 countries. In 1994, it had 4,444 members from 105 countries. Operation started in May 1977 with 15 banks in Belgium, France and Britain. Its US centre was opened in 1979, and Japan became a member in 1976 with operation starting in 1981. In 1980, SWIFT already processed a daily average of about 200,000 messages worldwide, and in 1993 80,000 were processed in Japan, about 4 per cent of the total.[20]

In August 1995, a group of European banks consisting of large British banks as well as several French, Dutch and Scandinavian institutions launched the Exchange Clearing House (Echo) in London thereby extending the concept of netting on to a multilateral basis. Participants of Echo no longer make payments to each other but to the Echo clearing house. Compared to bilateral procedures multilateral netting reduces payment flows still further since transfers are made by all members to a single counterparty. A single daily payment in each currency, covering all its transactions with other members, is all that is necessary between each member and the clearing house' (Shirreff 1996:67). Since the addition of the yen in early December 1996, Echo provides netting services in 14 currencies (Graham 1996d).

A competing system which received regulatory approval in December 1996 is Multinet. It has been established by six Canadian and two US banks. Like Echo, Multinet had to go through an arduous legal and regulatory process in order to clear deals in seven currencies in several jurisdictions. In principle, it also faces the same problems as Echo in that it is a capital-intensive business which needs members logging many deals to see returns. There are already talks about a merger between the two as well as the involvement of other systems to avoid a dissipation of effort. The differences between Echo and Multinet are said to be of a philosophical rather than a technical nature (see Shirreff 1996:68). Multinet is considered as a 'robust' clearing house which accepts and nets deals only after rigorously matching and testing for counterpart limits. Only payment-versus-payment transactions do not risk being rejected. All others can be refused and then the parties concerned have to settle that days deals bilaterally. In contrast, Echo initially accepts its members' deals. If balances cannot be settled parties are given a deadline of about two hours to sort out the problems.

In March 1996, seventeen of the world s largest foreign exchange banks went one step further. Under the name Group of Twenty they announced

plans to establish a global clearing house bank which would provide an instantaneous, payment-versus-payment settlement system linked to national systems such as CHAPS or Fedwire (see Graham 1996a). The Continuous Linked Settlement Bank (CLSB) is planned to focus initially on G10 currencies with the criterion for admitting a currency being that it has legal certainty based on a national real-time gross settlement system which provides payment from central bank accounts. The system would also accept netted payments from bilateral or multilateral netting systems such as Echo or Multinet and from pairs of banks thus moving further in the direction towards a comprehensive multilateral netting system worldwide.

The planned clearing bank would be open to any bank meeting certain qualifying standards. Members would have to pay money into their accounts every day with transactions debited and credited throughout the day. If, during the day, one member bank defaulted, losses would be shared among the others.

There are some of the world s biggest banks among the G20 members such as Citibank and Chase Manhattan from the United States, Barclays and National Westminster from Britain, Deutsche Bank from Germany and Fuji Bank from Japan. Together they account for about 30 per cent of global foreign exchange trading. Their participation would guarantee to overcome at least one problem other systems have so far. With a few exceptions, Multinet and Echo have failed to attract big banks which, in more than one respect, regard them as rivals (see Shirreff 1996:68). In principle, many banks are said to be not interested in supporting a clearing-house solution because this would undermine their competitive advantage and take away their counterparties. A clearing house gives all members' deals the same credit rating. In addition, it leaves no room for personal interdealer relationships that create many opportunities for the banks.

The real-time gross settlement solution favoured by the big banks has one drawback: in principle, in operating under the same liquidity constraints as national RTGS systems it presents considerable challenges to the national authorities. For the global clearing bank to work it would have to be linked to the national large-value interbank funds transfer systems which would require those systems to extend their opening hours so that both legs of a foreign exchange transaction over several time zones could be executed at the same time. Moreover, because transaction volumes in foreign exchange markets are so large, the account balances involved could drain considerable liquidity from the domestic money markets which is a matter of growing concern for central banks.

The aspect has gained particular importance for the design of the European payment system Target (standing for Trans-European Automated Real-time Gross-settlement Express Transfer) which from January 1999 on should link wholesale payment systems to allow instant transfer of euros, the newly established single European currency, throughout Europe. The issue that has arisen relates to the provision of intra-day liquidity by the central banks. For

the European Union some argue that such liquidity should not be available beyond the bounds of the currency area while others emphasise the need to avoid potential spillover into overnight credit which would have an impact on monetary policy and therefore matters most.[21]

But the question of intra-day liquidity and overnight credit in interconnected RTGS systems stretches far beyond the European Union. The proposed G20 system will have a provision that if liquidity is unavailable in one currency it could be delivered in another one if the counterparty has enough value in its collateral pool (see Shirreff 1996:72). In principle, this can be regarded as shifting liquidity problems from one currency to another with, for example, shortages in dollars causing shortages in yen. To calm the central banks' fears in this respect the Continuous Linked Settlement system is being designed to ensure that using one currency to settle another one will at least take place only intra-day and not overnight.

The discussion touches the general question about a financial system's nature and the relationship between banks and central banks. In recent years, monetary authorities in G10 countries have assumed a more active role in shaping their financial systems, partly in reaction to the episodes of financial distress described earlier. For example, the US Federal Reserve guarantees payment finality in case a bank fails to settle. This means that transactions will not be unwound but the central bank will step in (*The Economist* 1996e).

Several risk control measures have been introduced in major interbank net settlement systems (Table 7.7). These include the shortening of the settlement lag by switching to same-day settlement and the provision of facilities for real-time monitoring of banks' intra-day positions as well as the setting of caps on the bilateral and multilateral net debit positions of participants. However, the safeguards experts consider the most important are liquidity pooling and loss-sharing arrangements. These measures aim at decoupling illiquidity from insolvency problems by eliminating the cash-flow shortfall and allowing the losses on the underlying contracts to be dealt with separately through the courts (see Bank for International Settlements 1994:181). In this respect, most

Table 7.7 Risk control measures in major net settlement systems

Measures	*CHIPS*	*CHAPS*	*FEYCS*
Same-day settlement	1981	1984[a]	1989
Real-time monitoring	1970a	1984	1989
Bilateral debit caps	1984	1992	1989
Multilateral debit caps	1986	1993	–
Loss-sharing rule	1990	–[b]	1989
Collateral requirement	1990	–	–

a Year in which the system was launched.
b Since 1992 losses have been explicitly related to bilateral exposures.
Source: Bank for International Settlements (1994:181)

systems, except in the United States and, in parts, in Japan, are still lagging behind.

For Japan's FEYCS a loss sharing rule exists but liquidity-pooling and collateral requirements are still lacking. In March 1996, the Federation of Bankers Associations of Japan announced plans to introduce a pooling of funds within the next two years. The amounts collected will suffice to cover the net balance of one or two big Japanese banks. In addition, there are plans to allow settlement to take place continuously between 9 a.m. and 5 p.m.[22]

With respect to real-time gross settlement systems the biggest problem remains moral hazard. The fear is that central banks' close involvement in the payment and settlement process, and the knowledge that they provide finality and a safety net, may create confidence and encourage banks to take more risks than otherwise. The result could be huge daylight overdrafts and high costs of bail-out. Central banks have taken various measures to cope with this problem. For example, the New York Federal Reserve has begun to charge fees for daylight overdrafts and to require collateral from banks with regular large credit positions. The Bank of England too requires collateral before settlement accounts can be overdrawn. The Bank of Japan forbids daylight overdrafts. Instead, banks have to turn to the interbank market (The Economist 1996d, Shirreff 1996:70).

In reaction to the foreign exchange settlement risk the G10 has put in place a three-point strategy to achieve significant progress within the next years. This involves action by individual banks, by industry groups and by central banks. The central banks' role in this process so far is an accompanying one publicising the issue and monitoring banks' and industry groups' responses. However, if progress is not regarded as adequate further action will be considered implying a greater policy involvement. For Japanese banks this would be nothing new. As the following chapter shows, they already live with a vast amount of political interference.

Part IV
POLICY ISSUES

INTRODUCTION

When in March 1996 in response to the Barings crisis some forty-nine international derivatives exchanges and clearing houses as well as fourteen regulators worldwide signed an information sharing agreement designed to increase transparency and reduce systemic risk in international financial markets neither Japans supervisory authorities nor its futures exchanges took part in it. The reason given was regulatory obstacles. Japan is one of the countries where exchanges are prohibited by local regulation from entering any information sharing agreement.[1]

This is but one example of the vast range of official rules and limitations the country is notorious for. Since the 1980s, there had been considerable financial reforms, but many controls still prevail. This holds for official regulations as well as for the many ways of informal administrative guidance. Due to the peculiar nature of relations between government, administration and private sector business groups in Japan each effort to loosen existing restrictions becomes a balancing act between the various interests posing severe impediments to any fundamental change.[2] In particular, the foreign exchange market is still subject to many kinds of policy interference.

8

MARKET REGULATION

In academic circles, the appropriate role of bank regulation, or whether banks should be regulated at all, is widely debated. Many economists who accept the principle of free trade in general deny that it applies to the banking sector. They regard banks as something special. Banks' liabilities are used as money and it is the public-good character of this 'moneyness' which is given as the main justification for regulation: 'moneyness (rather than any particular money asset) satisfies the conditions of non-rivalry-in-consumption and non-excludability-in-exchange' (Dow 1996:698) By means of official regulation the state is creating confidence in the value retaining function of money which, given the uncertainty ruling the economic process, is a necessary prerequisite for its use as means of payment, store of value and, above all, unit of account and denominator of contracts which is central to the functioning of an economy.

PRINCIPLES OF BANK REGULATION

One reason given for government interference is that banks are considered particularly vulnerable to a general loss of confidence due to a structural fragility resulting from their low ratios of cash reserves to assets and of capital to assets compared to their high short-term debt (see Benston and Kaufman 1996:692). There is the danger of bank runs. If all demand and short-term depositors try to withdraw all their money at the same time, even a solvent bank has a problem unless it sells the necessary assets, or borrows the necessary funds, quickly, and even then the related transaction costs may easily render it insolvent. In addition, there is the contagion argument that says if the difficulties of one bank lead to a general loss of confidence inducing the public to withdraw funds elsewhere, too, they may spill over to other banks thereby threatening the stability of the financial system as a whole. Contagion is often considered to be more likely in the financial industry than elsewhere which is mainly explained by 'the network of interlocking claims and liabilities' (Crockett 1996:538) through the interbank market, over-the-counter derivatives transactions and the payment and settlement system.

Another reason for bank regulation is market failure which may arise as a result of asymmetric information between banks and their customers. Under *laissez-faire,* so the argument goes, banks could easily end in a process of ruinous competition if some of them take high risks in search of short-term profits thereby forcing others to go along with their policies or quit the market. Customers in the financial sector find it particularly difficult to judge banks on the basis of publicly available information and usually cannot distinguish the 'bad' banks from the 'good' ones. They recognise their mistake only when a bank fails. At that time, changing to another institution may have become impossible if all 'good' banks are already driven out of the market. Proponents of free banking, or at least lesser bank regulation, take a different view.[1] They say that without government interference providing a safety net banks have an incentive to pursue conservative lending policies, hold adequate capital, publish audited accounts and adopt many more measures to maintain depositors' confidence. In addition, they have a strong motive for distancing themselves from competitors taking excessive risks in anticipation of their failure when they will stand ready to win over the others' customers and increase their market share at the others' expense. In this way they also limit the danger of contagion. The difficulties of a weak bank can be expected to trigger a 'flight to quality' with the solid banks serving as safe havens to customers transferring their accounts to them.

In the end, the case for or against bank regulation seems to boil down to the question of the extent to which information asymmetries among banks, and between banks and customers, as well as time lags in the process of gathering and spreading of information are able to distort market conditions and influence market participants' behaviour. Banks have an incentive to take measures to maintain depositors' confidence only if their customers are able to monitor bank management and find out about the banks' true state. They have an incentive to distance themselves from unsound practices only if, on the one hand, they have the necessary information to do so and, on the other, they need not fear being driven out of the market before they could benefit from this attitude. But, as past experience shows, these conditions are hardly ever met. In addition, as the discussion of payment system risks demonstrated, banks need not even be directly engaged in dubious activities to get into trouble. Even a sound bank cannot always obtain loans to maintain its liquidity, as claimed (Dowd 1996:683), when the amounts involved may by far exceed the value of its total assets.

Nevertheless, experience also demonstrates that, in the past, banks have rarely been regulated for efficiency or safety purposes alone. The two main reasons observed were to limit competition and to provide revenue and power for government officials (compare Benston and Kaufman 1996:694–5). Japan is no exception. The strict separation of financial services prevents commercial banks from fully competing with securities firms. Fixed brokerage commissions protect the securities firms, and the still regulated interest rates on postal savings accounts serve the Ministry of Posts and Communications well, to name only a few examples.

With respect to the regulatory approach in major industrial countries there is a strong contrast between the European system, represented by the British and the German approach, on the one hand, and the American and Japanese on the other (see Frankel and Montgomery 1991:273–81). The latter place many more restrictions on the activities of financial institutions than the former (Table 8.1). This refers to the scope of bank's permissible activities such as securities and investment business as well as to restraints placed on branching. With respect to the latter, there are geographical restraints in the United States which vary from state to state. In Japan, control over branching serves as a most effective instrument of general control and administrative guidance by the Ministry of Finance. Another difference concerns the bank ownership of non-financial firms which is strongly restricted in the United States and Japan, too.

The difference in attitudes is also reflected in the number of statutes developed over the years to govern the banking system in various countries. Up to 1993, there had been 5 respective statutes in the United Kingdom,[2] but 31 in Japan[3] and 37 in the United States. There is a fundamental difference in supervisory style. For example, both Japans and the UK's authorities are known for their informal ways to influence markets. Supervision by Japans Ministry of Finance and the Bank of Japan relies strongly on 'administrative guidance' *(gyosei shido),* which, in principle, means that, like the Bank of England and other central banks, it is using various forms of moral suasion alongside the rule of law and prudential requirements.[4] Nevertheless, supervision practices in both countries have not much in common.

While, in principle, Japan's supervisory authorities follow an inspection-based approach the Bank of England strongly relies on management interviews (Hall 1993b: 32). In the latter, based on the analysis of a vast amount of statistical information a large number of issues are raised ranging from the bank's future business plans and profitability forecasts to the reporting accountants' and auditors' reports on accounting procedures, the keeping of records, internal control systems and many more. The result is a subjective evaluation of the adequacy of prudential safeguards as well as judgements on management competence and expertise. In case of deficiencies, advice is given on the form and duration of any remedial action.

This practice has often been criticised as being too informal with too much emphasis laid on personal relations, tradition and reputation, rather than on an analysis of figures. Partly in response to those critiques the Bank of England is putting somewhat more weight on formal criteria in recent years and interviews are taking place more often in the banks' own premises rather than at the central bank.[5] But, with a strong emphasis on the competitiveness and functioning of the City of London as an international financial centre the main strategy remains 'not to nanny the banking system, or prevent banks from making their own commercial decisions. The supervisors must not and do not try to supplant a bank's management in judging the best strategy for a bank to follow' (Bank of England 1996b).

Table 8.1 Regulation of banks' domestic activities in international comparison

Legal issue	*Japan*	*Germany*	*United Kingdom*	*United States*
Principal regulators[a]	Ministry of Finance (MoF)	FBSO,[b] Deutsche Bundesbank	Bank of England (BOE)	Federal Reserve Board, others
Branching restrictions:				
• geographic	None	None	None	Extensive
• regulatory	Number limited by the MoF	Notification required	Prior notice to the BOE	Authorisation by federal or state agencies
Scope of permissible activities:				
• securities	Limited	Full range of activities permitted	Full range of activities permitted	Limited
• insurance	Not permitted	Full range of activities permitted through subsidiaries or parents of banks	Full range of activities permitted through insurance-company subsidiaries or parents of banks	Restricted powers for national banks; for state banks varying according to state law
• industrial investments	Limited to holding 5 % interest	Individual interests not limited; restrictions on a bank's total amount	Permitted subject consultations with the BOE	Generally limited to holding 5 % interest through a bank holding company

a Of commercial banks.
b Federal Banking Supervisory Office (Bundesanstalt für das Kreditwesen).
Source: Frankel and Montgomery (1991:274–7, Table 4)

In contrast, the main objective of Japan's supervisors seems to be to fill any gaps left between the vast number of rules already limiting the banks' scope of action. Bank supervision in Japan is conducted by the Bank of Japan and the Ministry of Finance with the latter being the primary supervisory authority. Its Banking Bureau is responsible for the supervision of banks and their overseas affiliates and its International Finance Bureau oversees the supervision of the foreign activities of Japanese financial firms in general (see Hall 1993b: 149–63).

Until recently, in order to avoid unneccessary effort the Ministry and the Bank alternated in conducting on-site inspections about every two years

aiming to ensure that, in principle, each bank is visited once a year. The Ministry of Finance employs about 100 officials to examine some 150 large banks. In addition, in its eleven local finance bureaux there are about 300 inspectors supervising 420 *shinkin* banks, small local banks. Examinations by the Ministry's inspectors take about six weeks. Inspection teams for a major bank usually consist of twelve inspectors headed by two experienced officials. The intensity of supervision and the frequency of inspections is determined by a rating system which was introduced in 1988. On the basis of criteria such as net worth ratios, asset quality, management control systems, profitability and liquidity institutions are ranked on a scale of one to five. In 1995, in response to the fragility of Japan's financial system and a growing risk awareness the Ministry decided to increase the frequency of examinations to about once a year. In addition, it revised its criteria emphasising the banks' need for monitoring derivatives dealing and setting up appropriate risk management systems (Saeki 1995).

The Bank of Japan oversees 680 financial institutions including banks, securities companies and money market brokers. Its inspection bureau consists of about 200 officials. Examinations are pre-announced and usually last from two to three weeks (see Hall 1993b: 150). One or two weeks after the inspection the results are reviewed with the institution which, again, is classified according to a rating system basically containing the same criteria as applied by the Ministry of Finance. However, the rating given is not disclosed to the bank despite the fact that, in principle, it may influence the future form of supervision and the frequency of examination. This hints at another difference from the British system where the transparency of the authorities' decisions is always guaranteed. For example, any material changes of criteria have to be recorded in the Bank of England's annual report and there are rights of appeal against them (compare Hall 1993a: 92–3).

Beside formal rules and procedures, both the Bank of Japan and the Ministry of Finance use some form of 'administrative guidance' which is not legally enforceable but on which the banks are expected to act. The Bank of Japan still 'advises' banks on their lending policies although the official system of 'window guidance' *(madoguchi shido)* was formally abandoned in 1991 (compare Kohra 1993:286, Nakao and Horii 1991:23). Originally, the formal procedure had been that the Bank of Japan asked the city banks how much they expected to lend in the coming quarter. Then, it fixed an aggregate limit and distributed the total among the banks telling them how much they could lend (compare Walmsley 1983:50). In 1983 the authorities switched to a modified form under which they only informed the banks of the expected total credit demand in the following quarter. Since 1991 they claim not to interfere. Nevertheless, the Bank of Japan still 'knows exactly what each commercial bank plans to lend and makes clear its preferred policy' (Deane and Pringle 1994:253). At least when big loans are granted the Bank still gets informed in advance, and its advice is sought.

Administrative guidance by the Ministry of Finance takes many forms. It comprises 'directives', 'requests', 'warnings', 'suggestions' and 'encouragements' transmitted mostly via notifications or official liaison letters (Hall 1993b: 151). In addition, both the Bank and the Ministry are strongly involved in behindthe-scenes moves promoting or assisting bank mergers, take-overs and bail-outs of failing banks. Both are also in close contact with other ministries and official institutions in their handling of activities under their joint responsibility where the informal process often has replaced former official rules and regulations. An example is the prenotification discussions preceding formal application for direct investment into Japan.[6] Except for a few industries, formal entry restrictions on inward direct investments were ended with the reform of the Foreign Exchange and Foreign Trade Control Law in 1980. However, in a variety of situations the investor has to give prior notice to the Bank of Japan with the case reviewed by the Ministry of Finance and other ministries concerned. There is widespread agreement among observers that for an application to be successful 'it is crucial for a foreign investor to notify the relevant ministry officials and clear the terms of the transaction before formal notice is filed' (Bailey *et al.* 1994:29). Administrative guidance in the form of prenotification discussions has replaced the law as an instrument of regulation.[7]

The informal approach of supervision is facilitated by a close network of relations between government institutions and private firms which is not restricted to the financial sector. One pillar of this system is the 'Old Boys', former government officials who retire at approximately age 50 and are then appointed as corporate directors and advisors to private firms.[8] The Old Boys network ensures that information flows smoothly between industry and government and helps coordinate relations between the two. In firms' board discussions the Old Boys can voice the aims of the regulators and, on the other hand, they are expected to represent the firms' interest at their frequent visits to the ministries and the Bank of Japan.[9] Despite the widespread notion that with increasing deregulation and growing internationalisation the governments informal influence in general, and that of the Old Boys network in particular, have lost much of their former relevance, the contrary appears true: empirical studies have found indications that compared to the early 1980s there is an even higher presence.[10]

A second pillar of the Japanese system of informal relations is the large number of private, official and semi-official research institutes with their close cooperation and continuous exchange of scholars from financial institutions and other private sector firms, universities and government. Besides doing fundamental research their staff engage in policy discussions, participate in councils and study groups organised by the ministries and help to formulate and prepare concepts for regulation or deregulation.

At first sight, the Japanese system of controls and close informal supervision appears superior to the British approach to coping with today's complex financial markets. But, the system neither prevented the banks' accumulation

of bad debt during the speculative bubble in the second half of the 1980s nor did it hinder the involvement of Japanese banks in scandals and criminal affairs. And, it proved particularly ineffective in controlling the activities in Japan's foreign exchange market.

EXCHANGE RESTRICTIONS

At the time this book goes into print Japan is not only the only G7 country which is directly controlling foreign exchange trading by, in principle, restricting it to banks. It has also many limitations on all kinds of transactions related to foreign trade and investment which are intended to influence the foreign exchange market indirectly through the resulting demand for, and supply of, foreign currency. Initially, there had been three justifications for those restraints.[11] The first was to prevent external imbalances, sharp fluctuations in the exchange rate and the effects of massive international capital flows on domestic money and capital markets. The second was to support Japan's trade and industrial policies and the third to 'maintain world peace and ensure the fullfilment of responsibilities associated with international treaties' (Bank of Japan 1993c: 1).

Table 8.2 provides a survey of the restrictions. Depending on the type of transaction there are four different levels of regulation ranging from permission over prior notification with or without consequences to mere reporting. The first group consists of transactions which need an official permission by the Bank of Japan and/or the Ministry of Finance or the Ministry of Trade and Industry (MITI). If Japanese residents want to open an account in a foreign country, issue or subscribe securities in foreign markets without turning to a designated securities company for this purpose or import or export Japanese currency, checks and promissory notes in yen without going through an authorised foreign exchange bank they need the permission of the central bank or the respective ministry. The restriction does not only hold for any kind of commercial transactions but also for presents with the general limit above which those transactions need permission being ¥5 million (see Neumann 1994:282–3).

No Japanese firm is trading internationally on open account without permission. For investors in foreign securities there is a ceiling on the amounts they can hold on overseas accounts.[12] Up to February 1996, when some first modest liberalisation measures were taken, those investors were not allowed to settle transactions in foreign securities from their own overseas accounts in foreign currency. In addition, until then, yen-denominated interest-rate swaps between securities houses and non-resident investors were not allowed, and domestic companies could not settle transactions in foreign currency between each other without involving an authorised foreign exchange bank (compare Baker 1996a). What is not shown in the table is that, although for other reasons, Japanese banks, too, are restricted in lending to institutions overseas. Since 1996 they are allowed to lend to those institutions by 'two-step loans' through subsidiaries. However, even these loans are subject to constraints.

Table 8.2 Exchange restrictions in Japan

Type of restriction	*Authorities concerned*	*Regulated transactions*
Permission	BoJ	Donations Settlements involving special methods (e.g. netting) Opening of overseas deposit accounts by residents
	BoJ/MoF	Payments to listed countries[a] Purchase and sale of foreign currencies Flotation and subscription of securities by residents in overseas markets
	MITI	Service transactions in specified areas
	MoF (customs clearance offices)	Export and import of Japanese currency, checks and promissory notes denominated in yen
Prior notification[b]	BoJ (valid from the day of receipt of prior notification)	Direct investments abroad except for investment in designated industries
	BoJ/MoF (valid from the day designated by the MoF)	Direct investments abroad in designated industries Transfer into Japan of foreign industrial property rights relating to aeronautics, weapons and atomic energy, or the right to use them Direct investment into Japan in other than designated industries
Prior notification	BoJ	Borrowing of funds from non-residents Acquisition of securities for portfolio investments
Reporting	BoJ	Direct investments in designated industries into Japan Transfer into Japan of foreign industrial property rights relating to items other than aeronautics, weapons and atomic energy, or the right to use them

a Including Iraq, Serbia and Montenegro.
b With possible order to either suspend or alter/cease the operation.
Source: Bank of Japan (1993c: 6)

Transactions requiring prior notification can be divided into two groups. The first comprises above all Japanese direct investments abroad,[13] foreign direct investments into Japan in other than designated industries[14] and, with certain exemptions, imports of industrial property rights. Here, prior notification can result in an order either to suspend the project or to alter or cease it. In the second group which consists of borrowing funds from non-residents and the acquisition of foreign securities for portfolio investment prior notification is required, too, but without consequences.

In addition to the regulations shown in the table Japan's investors' activities abroad are subject to various restrictions under other areas of legislation which, at times, are all directed at the same purpose. For example, foreign portfolio investments by institutional investors are regulated in many countries for prudential reasons. In Japan, prudential aspects mix with other considerations. After the lifting of foreign exchange controls in 1980 those investments rose sharply leading to strong capital outflows and pressures on the yen. In response to the pressures the monetary authorities imposed ceilings on the ratio of foreign securities holdings to total assets not only for insurance companies (where limits existed before) but also for other institutional investors. Since then, those ceilings have been used at various times to influence supply and demand in the foreign exchange market. For example, during the first *endaka* or yen appreciation they were raised for insurance companies from 10 per cent in 1980 to 25 per cent in March 1986 and again to 30 per cent in August 1986 (see Fukao 1990:145). Table 8.3 shows the maximum percentage of total assets insurers may invest in foreign securities in international comparison. There is a great diversity of regulation. For Japan, with a limit of 30 per cent imposed on life and non-life insurers alike the ratio is comparably high hinting as well at the fact that it is not first of all determined by prudential reasons.

The last group of transactions subject to exchange restrictions are those which require mere ex-post reporting. These are direct investments in designated industries into Japan and, with certain exemptions, imports of industrial property rights.

The exchange restrictions impose severe burdens on banks and add to the strains resulting from their overall reporting duties as well as from the regulations of their day-to-day foreign exchange business. Japanese banks face considerable reporting requirements concerning their foreign exchange business. For example, besides filling in numerous forms for currency trades related to transactions with customers in connection with foreign trade, direct investments and other activities they have to report the names and amounts for every customer transaction exceeding $3 million worth. There is a ceiling on the total amount of foreign currency banks can hold which, in April 1996, was raised for major institutions from $200 million to $600 million (Nikkei Online 1996c). This constraint refers to the sum of all spot and forward positions in foreign currencies which the banks report at the end of the day (Ikawa 1994:70–1).

Table 8.3 Upper limits for life insurers' investments in foreign securities[a]

Country	*Foreign shares*		*Foreign bonds and other securities*	
	Non-life	*Life*	*Non-life*	*Life*
Germany	6	6	5	5
Japan[b]	30	30	30	30
United Kingdom	–[c]	–	–	–
United States (New Jersey)	Investment must not exceed the value of outstanding policies in the foreign country	5% in the aggregate, 2% in foreign countries, except for qualified foreign investment as defined in the statute	Investment must not exceed the value of outstanding policies in the foreign country	5% in the aggregate, 2% in foreign countries, except for qualified foreign investment as defined in the statute
United States (Delaware)	5	5	5	5

a As percentage of total assets.
b Maximum for both classes of investment combined.
c Not available or not specified in the law.
Source: OECD (1996:65, Table 1)

The long list of exchange regulations demonstrates a deep distrust in all kinds of private sector activities. This distrust is particularly strong with respect to international capital movements. Like many other countries, Japan has rules to deal with an emergency and the situation whereby massive capital flows impose a serious threat to its economy. Tables 8.4 and 8.5 show the difference in regulation of transactions under the jurisdiction of the Ministry of Finance[15] under normal and extraordinary circumstances.

Two kinds of capital flows can be distinguished, those needing permission at all times and others which under normal circumstances require prior notification or reporting but become subject to stronger quantitative or qualitative controls if certain criteria are met. Quantitative controls of a whole list of activities may be introduced if Japan's balance of payments is in disequilibrium, if the exchange rate is strongly fluctuating or if capital flows exert undesirable effects on Japan's financial markets. There are other transactions which can become subject to qualitative controls if they have undesirable effects on international money markets, or on certain Japanese industries or the economy as a whole, or if they become a hindrance for Japan in fulfilling international agreements.

The authorities' distrust of private sector activities is the main reason why foreign exchange trading is restricted to authorised banks. The Ministry of Finance and the Bank of Japan sought to keep the number of 'players' in this field low for the sake of a better exchange rate control (compare Nikkei

Table 8.4 Restrictions on capital transactions I

Circumstances	*Transactions*	*Criteria for emergency regulation*
Regulated at all times	Deposits abroad by residents other than authorised foreign exchange banks	
	Purchase and sale of foreign currency funds and foreign currency loans between residents other than authorised foreign exchange banks	
	Flotation of euroyen bonds by non-residents	
Emergency regulation	Deposit transactions, purchase and sale of foreign means of payment and loans to residents by authorised foreign exchange banks[a]	(Quantitative Control) • Balance of payments disequilibrium • Sharp fluctuations in foreign exchange rates • Adverse effect on Japanese money and capital market through large capital movement
	Domestic and foreign securities investment (through designated securities companies)[a]	
	Acquisition of foreign immovable properties[a]	
	Guarantees (excluding those related to the flotation of bonds by subsidiaries abroad)[a]	
	Purchase and sale of gold bullion with non-residents[a]	
	Euroyen borrowing by residents[a]	

a Under normal circumstances free from regulation.
Source: Bank of Japan (1993c: 17)

Online 1996a). However, with increasing financial liberalisation in many countries, rising transaction volumes and a growing interdependence of money and capital markets worldwide this proved more and more an illusion. The only effects of regulation remaining were inefficiencies and high costs for all those firms which otherwise would not need to turn to a Japanese bank for trading in foreign currencies, first and foremost the big securities firms and trading companies, or to rely on a Japanese securities company for buying and selling foreign loans and bonds.

For years, academics as well as the business community in Japan called for a further liberalisation of the foreign exchange market. In the end, the government had only a few arguments left against deregulation and those did not appear particularly convincing. First, it worried about less reliable balance-of-payments statistics. Second, there was a fear of potential losses of government income as a result of increasing tax evasion, and, third, there were warnings about the dangers Japanese households and investors would face from unsound foreign bank practices. All three were not regarded as sufficient to maintain existing restrictions, in particular, since the drawbacks became more and more obvious (see Fukao 1996:101–2).

Table 8.5 Restrictions on capital transactions II

Circumstances	*transactions*	*Criteria for emergency regulation*
Emergency regulation	Borrowing of funds from non-residents by authorised foreign exchange banks or residents[a]	(Quantitative control) • Balance of payments disequilibrium • Sharp fluctuations in foreign exchange rates • Adverse effect on Japanese money and capital market through large capital movement
	Securities investment not made through designated securities companies[a]	
	Acquisition of domestic immovable properties by non-residents[a]	
	Lending of funds to non-residents by authorised foreign exchange banks and residents[b]	(Qualitative control) • Adverse effect etc. on international money markets • On domestic money and capital markets • On the business activities of certain domestic industries or the smooth performance of the Japanese economy • Hindrance of the faithful performance of international agreements
	Guarantees related to the flotation of bonds by subsidiaries abroad[b]	
	Direct investments abroad[b]	
	Issue of securities abroad by residents[b]	
	Issue of securities in Japan by non-residents[b]	
	Issue of securities in Japan in foreign currencies by residents[b]	

a Under normal circumstances prior notification required.
b Under normal circumstances prior notification with the possibility of the transaction ordered to be altered, suspended or ceased.
Source: Bank of Japan (1993c: 17)

At the end of 1996, decisive steps towards liberalisation were taken. In November Prime Minister Ryutaro Hashimoto announced reciprocal intents and in December of the same year the Committee on Foreign Exchange and Other Transactions headed by Tomomitsu Oba[16] published the summary of a report (Special Subcommittee for Legislative Study 1996) which contained plans for concrete reform measures.

The main reason for the government's change in attitude was the lasting weakness of Japan's financial markets and the fears that a further 'hollow out' or *kudoka* would seriously damage their international competitiveness. A

regulated foreign exchange market, in a sense, should no longer shelter Japan's banks from foreign competition and allow them to stay largely inefficient. In addition, the international role of the yen was to be strengthened. Accordingly, the plans for a reform of the rules were only the first part of a bigger programme intended to become Japan's 'Big Bang'. Its aim is to revive the country's financial markets and make them able to compete with those in London and New York by the year 2001. The key points of this programme, which is highly ambitious but in most parts still vaguely formulated, are (compare Suzuki 1996c):

- to remove intermarket barriers and restrictions on inbound and outbound transactions;
- to allow for new financial products and services and to liberalise transaction fees;
- to revise investment regulations for the management of individuals' financial assets;
- to establish clear disclosure rules; and
- to put the legal, tax and accounting systems in line with global standards.

The report of the Special Subcommittee gives first hints of the extent of the intended liberalisation of exchange transactions. The three main points of the concept which, according to the plans of the Japanese government, will be introduced in 1998, are the fundamental abolition of permission and prior notification requirements, the move to an ex-post reporting system and an extended admission to the foreign exchange business.

The new rules will not mean that trading will be totally free. But, if the government follows the Subcommittee's proposals, at least formally, the changes will be remarkable. The system of authorised foreign exchange banks and designated securities firms will be abolished. Firms and individuals will be allowed to hold deposit accounts overseas. They will be able to settle transactions through multilateral netting schemes without permission or prior notifications. Restrictions on banks' foreign currency positions will be replaced by market risk regulation along international standards. The criteria for emergency rules will be revised.

Naturally, not all will be winners as a result the reform. For the banks, besides the loss of clients and the emergence of potential new competitors the main drawbacks will be the extended reporting requirements the concept calls for. For example, to assure 'sound market development' and to acquire additional information to avoid tax evasion by banks as well as by their customers the institutions will be required to inform tax authorities of overseas remittances exceeding ¥1 million from April 1998 on (*The Nikkei Weekly* 1996c). The Subcommittee is aware of the drawbacks of excessive reporting and calls for an overall revision and reduction of reports asking for a 'rather simplified and rational reporting system'. In addition, it considers the possibility that 'some intermediaries should be able to make consolidated reports on

several transactions within a certain period, rather than reporting each and every transaction. …Those who submit reports through certain intermediaries should be exempt from legal reporting requirements' (Special Subcommittee for Legislative Study 1996).

There is another drawback which has already become visible. The news that in course of the reform 'the government is also considering urging corporations and individuals to inform the relevant authorities when they open overseas accounts' (*The Nikkei Weekly* 1996c) is a first indication that under the new system burdensome reporting requirements will extend to non-financial firms, too, and that the grip of informal guidance perhaps may not be loosened in the same way as the formal rules. The phenomenon that a rule is officially abandoned but informally continued to be followed in one way or the other, with all resulting obfuscation and inefficiencies, is quite common in Japan. One typical example is the principle of 'window guidance' discussed above. But, the widening of informal practices on the eve of Japan's 'Big Bang' would cast doubt on the seriousness of the whole concept.

RISK MONITORING AND RISK PROVISION

One prerequisite for a competitive foreign exchange market also emphasised in the Subcommittee's concept is the adoption of international standards to cope with financial market risks. Nowadays, official risk monitoring and risk provision has two aspects: a national and an international one. There is no space here to consider all the ways in which a government may intervene in this purpose. However, there are two specific concepts for stabilising the banking sector which in all major industrial countries are considered as particularly important (see Dowd 1996:683). These are the lender-of-last-resort function of central banks and the countries' deposit insurance system.

Originally, the lender-of-last-resort function was thought to provide liquidity for banks in case of runs or other indications of severe crisis and potential collapse of the financial system as a whole. In Japan, this principle has found a much wider interpretation in that, in the past years, the Bank of Japan has bailed out failing institutions and participated in lifeboat actions for individual banks without any acute signs of systemic danger.[17]

The Japanese experience exemplifies the problem of moral hazard connected with the lender-of-last-resort function. As far as the lender of last resort is supporting weak banks that otherwise would face ruin excessive risk-taking of 'good' and 'bad' banks alike is encouraged and the discipline of the market is undermined. 'If banks believe they will be rescued in case of illiquidity, they will have fewer incentives to manage their portfolios prudently' (Crockett 1996:549). In the end, the lender of last resort is contributing to the very instability which should be prevented. In Japan, the danger is particularly great since, until recently, the Japanese financial system was considered to

be most stable and both Japanese banks and authorities took great pride in the fact that since World War II there had been no single bank failure. As a result, one of the biggest problems for the country's financial community nowadays is to get used to the possibility of a bank being allowed to fail.

Moral hazard is also the main argument against a state-sponsored system of deposit insurance. Depositors insured against loss have little interest in the banks' soundness, and banks which need not maintain depositors' confidence no longer have any incentives to maintain their capital strength and become willing to take greater risks. At least, this would be the case if all banks were fully protected. Japan is a long way away from that state.

The Japanese deposit insurance system was established in 1971.[18] Originally founded to compensate depositors in case of bank failures, its rules were changed in 1986 to allow for preventive measures as well. Nowadays, for example, under certain conditions, the Deposit Insurance Corporation (DIC) can provide support funding to finance mergers between bankrupt institutions and healthy ones and, for this purpose, it may also issue loans. Formally, the level of protection is fairly high in international comparison. In 1993 it amounted to ¥10 million ($81,100), compared to $23,400 for the United Kingdom, $75,200 for France, $20,800 for Switzerland and $100,000 for the United States (Goodhart and Schoenmaker 1995: Appendix 1B).

However, as long as the DIC has existed there has never been a case of direct compensation of depositors and, until recently, even support funding did not occur very often.[19] The first bank receiving support funding was the Iyo Bank in 1992, which received ¥2 billion for a merger with the Toho Sogo Bank. The first truely large payout was ¥40 billion for the Tokyo Kyodo Bank set up by the Ministry of Finance and the Bank of Japan in 1995 to take over two bankrupt credit unions, the Tokyo Kyowa Credit Corporation and the Anzen Credit Cooperative. Those and other payments already threatened to exhaust the DIC's reserves which, in 1995, within a single year fell from ¥876 billion to ¥380 billion. Therefore, if in the past depositors in Japan did not care much about banks' soundness possible compensation by the deposit insurance cannot be the explanation.

In May 1995, the Ministry of Finance announced a reform of the DIC (Ministry of Finance 1996). The aim was to provide a smooth transition to normality for Japan's ailing financial institutions. Under the new system contributions will be increased within five years to create a broader basis for support funding. With regard to the depositors' interests the rules state that the DIC will be able to exercise their rights on their behalf in case of a company reorganisation procedure or the like and that a system of deposit purchase is introduced under which the DIC would provide depositors with the equivalent of the amounts they could expect beyond the ¥10 million coverage after the end of court procedures. This says nothing about the future practice of compensation.

One alternative to the moral hazard associated, in principle, with both the lender-of-last-resort function and the deposit insurance is to regulate banks' behaviour and to ensure that they are adequately capitalised against the risks

they run (see Crockett 1996:550–1). The problem here is that in the highly developed and interconnected financial centres worldwide differences in national regulatory and supervisory rules bear incentives for a kind of 'regulatory arbitrage' where financial institutions which are subject to fewer controls, and implicitly have lower costs, at their home countries are pushing into stronger regulated places. There they are highly competitive due to their cost advantage and may easily gain market shares. Again, the problem is information asymmetries. For other participants and customers in these markets it is hardly possible to judge the risks related to these new entrants. This is the reason why from the outset supervisors sought for a convergence and harmonisation of national standards.

The idea of harmonised capital standards for internationally operating banks came up in the 1980s in the United Kingdom and the United States.[20] The Bank of England made preparations for London's 'Big Bang' and before extensively deregulating the financial system it wanted to state at least some rules of the game for the market place. The Federal Reserve searched for means to contain the growing financial risks arising from global economic imbalances, the Latin American debt crisis and the fragility of the US banking system. The strong presence of Japanese banks in both countries was the main motivation to search for international harmonisation. Japanese banks already had an enormous competitive advantage due to the lax rules they were facing at home in this respect and now they would be the first to gain from a strengthening of regulation.

However, before an international agreement was reached huge obstacles had to be overcome. The difficulties started with the definition of capital. During the process of negotiations Japan and Germany turned out to represent the opposite poles of the spectrum of positions (Solomon 1995:426). The Germans insisted on 'pure' capital, which is shareholders' equity and retained earnings. On the other hand, the Japanese side even wanted to include unrealised capital gains on banks' equity portfolio, a category of 'dirty' or second-rate capital no other country took into consideration.

In the end, the Basle Accord reached under the auspices of the Bank for International Settlements (BIS) in 1988 called for minimum capital at internationally active banks of 8 per cent of risk-weighted assets, of which 4 per cent had to be Tier 1 or 'pure' capital. For the other 4 per cent there are five risk-weighting categories ranging from zero over 10, 20 and 50 to 100 per cent. Off-balance-sheet instruments are included. The agreement is legally non-binding. Nevertheless, 'the central banker club code of honor made it as good as law' (Solomon 1995:435).

In Japan, the agreement was greeted with fierce criticism.[21] Many Japanese regarded it as a 'Trojan horse for Japan' (Hisamizu 1993:21), intended to weaken the country's international financial competitiveness, which, in part, it probably was. For example, following the initial proposal of the United Kingdom and the United States to exclude unrealised capital gains on banks' shareholdings, Japan's largest component of capital, and subtract cross-equity

holdings among banks, would have forced Japan to retreat from international markets for a long time.[22]

The critique concentrated on applying the same capital measure for all banks ignoring national differences such as banking structures and the degree of market competition, tax systems and accounting standards. Further, the riskweighting scheme was considered highly arbitrary. For example, it artificially divided the world into two types of sovereign borrowers, the OECD countries and Saudi Arabia with zero weight and all other countries with 100 per cent. Another argument often heard in Japan was that Japan's government need not care, and Japan's banks did not need rules, because its financial system is fundamentally sound, a view which turned out to be a fatal error.

Despite all standardisation the BIS rules leave much room for interpretation by national authorities. In Japan, it is the Ministry of Finance which has the final say in the range of banks concerned and in what is to be included in the definition of capital. Above all, Japan's banks are considered to have a comparative advantage in that they may count up to 45 per cent of unrealised gains on securities holdings as Tier 2 capital.[23] But this decision has its drawbacks, too, rendering them particularly vulnerable against variations in stock prices. Table 8.6 shows the critical levels of the Nikkei 225 Index for Japan's best capitalised banks at which their BIS ratios would have fallen below 8 per cent end of March 1995 when the Nikkei s actual financial year-end level was 16,140.

Although the definition of Tier 1 capital is less ambiguous, it leaves some scope for interpretation as well, as the discussion about the treatment of preferred shares in Japan has demonstrated (*The Nikkei Weekly* 1996c). According to the

Table 8.6 BIS ratios and the Nikkei Index

Bank	*BIS ratio*[a]	*Critical capital level*[b]
Dai-Ichi Kangyo Bank	9.40	13,500
Hokkaido Takushoku	9.22	14,000
Bank of Tokyo	10.62	13,300
Sakura Bank	9.58	13,700
Mitsubishi Bank	9.89	11,700
Fuji Bank	9.65	12,600
Sumitomo Bank	9.70	12,800
Daiwa Bank	9.30	14,900
Sanwa Bank	9.94	11,500
Tokai Bank	9.60	13,600
Asahi Bank	9.68	12,900
Industrial Bank of Japan	9.33	13,400
Long-Term Credit Bank	9.36	12,700

a As of 31 March 1995.
b Level of the Nikkei 225 Index at which the bank's BIS ratio falls below 8 per cent.
Source: Baker, G. (1995c)

Basle rules banks are not allowed to count preferred stock issued by a foreign subsidiary as Tier 1 capital. Until September 1996 Japanese banks were exempted from this rule by their Ministry of Finance. Then the authorities changed their mind. They informed Nippon Credit Bank that they would not accept a planned ¥50 billion issue of preferred shares by Nippon Credit Bank (Curacao) Capital NV to be counted as Tier 1 capital. So far, Japanese banks had regarded such issues as a welcome means to improve their capital adequacy without driving their stock prices down. The change came after complaints from foreign competitors who regarded the Ministry's decision as a clear abuse of power and an effort to grant the banks loopholes to circumvent the BIS rules.

Generally, Japan's authorities have not shown much enthusiasm for the concept of capital adequacy. They reluctantly agreed to the Basle rules mainly because otherwise they would have faced exclusion of their banks from London and New York (Solomon 1995:421). But, it seems as if they never fully accepted the spirit of the Accord. Internationally operating banks in Japan usually meet the 8 per cent capital requirement once a year, on 31 March, but, in many cases, the result is uncertain up to the last moment. Beside, there is a national standard in addition requiring much lower ratios.[24] Banks which are not internationally active in the regulatory sense have to observe a minimum capital ratio of 4 per cent along this standard but many institutions fail to reach even this number.

In contrast, most competitors from other countries are subjected to much higher requirements on a national level.[25] For example, in 1995, the US Federal Reserve regarded banks as well capitalised when they had a Tier 1 capital of at least 6 per cent of risk-adjusted assets. Chase Manhattan had a respective ratio of 8.3 per cent and JP Morgan of 9.6 per cent. Rating agencies are usually pressing for a Tier 1 ratio of 8 or even 9 per cent before awarding a bank an AA rating.

The preference for a more flexible approach to capital adequacy is also reflected in the 'Prompt Corrective Action', a programme to improve the state of Japan's ailing financial system the Ministry of Finance announced in 1996. The programme calls for several measures to be adopted by Japanese banks from April 1998 onwards. According to an interim report presented by a study group in December 1996 (Study Group on Prompt Corrective Action 1996) it will be based on two pillars, a revision of the national standard for capital adequacy and a thorough reform of bank management.

With respect to the latter, banks coming under the concept are divided into three groups. With a capital ratio along international standards of less than 8 but at least 4 per cent, or less than 4 but at least 2 per cent along the national standard, they are required to simply formulate and implement a management improvement plan. Those with a BIS ratio of less than 4 per cent (2 per cent national standard) face a whole bundle of measures from the formulation of plans on how to increase capital over restraints on asset changes, a prohibition on entering new business fields and restrictions on current business activities up

to the prohibition on paying dividends or bonuses to directors and taking deposits at high interest rates. The third group of banks has a capital ratio of 'less than zero per cent'. As a rule their business will be either wholly or partly suspended.[26]

The second pillar of the 'Prompt Corrective Action' programme is the revision of the national standard for calculating capital ratios. The planned corrections refer to the numerator as well as the denominator. Above all, they consist of an inclusion of subordinate debt instruments and an exclusion of unrealised securities gains as well as the adoption of the same risk weights as for the international standard.

Certain reservations about international harmonisation efforts can also be found in the authorities' attitude towards the latest proposals of the Basle Committee on Banking Supervision concerning the treatment of market risks (Basle Committee on Banking Supervision 1995). While the 1988 Accord focused entirely on credit risk the latest amendment requires banks to hold capital specifically against variations in prices and exchange rates from the end of 1997 onwards taking into account the shirts in banks' business from traditional forms of lending to the trading of securities, foreign exchange and derivative financial products in recent years.

Under the rules, almost all internationally operating banks will need more capital. This is partly compensated by allowing, for the first time, for netting.[27] The Basle proposal contains a standardised framework for risk measurement, but the banks will be allowed to use their own internal VAR or other models for measuring market risks instead if they satisfy a number of qualitative criteria specified by national supervisors which will ensure that they have proper risk management controls and systems. Those are in detail (see Jackson 1995:183):

- the existence of an independent risk control unit which is reporting directly to senior management, evaluating the relationship between measures of risk exposure and trading limits and conducting regular back testing;
- an active involvement of senior management in risk control;
- the consideration of the results of stress tests for the formulation of policies and limits set by management and the board of directors; and
- an independent review of the risk measurement system carried out regularly in the bank's internal auditing.

Given the present state of affairs not many Japanese banks will be in this category.

With respect to the new rules the Japanese authorities, again, emphasise the need for a flexible approach. The Bank of Japan has announced it will

> aggressively make use of the market mechanism instead of resorting solely to regulations…instead of just uniformly disclosing only the standard items stipulated by accounting principles, financial institutions should disclose their own methods of risk assessment, and information on their potential risks and risk management performance gained

> under those respective methods. The market shall then make an evaluation of the methods and results of the disclosure. In other words, financial institutions should themselves determine what sort of risk control system they will establish and, by disclosing information based on the system, subject themselves to the market's judgement on the propriety of their management decisions.
>
> (Matsushita 1995:12)

This view, in a sense, neglects the problems of asymmetric information and moral hazard in the finance sector discussed earlier. Past experience, in particular with Japanese institutions, has demonstrated that this kind of flexibility means having too much faith in the banks.

From a central banker's point of view financial instability as a result of market risks is but one of the problems related to foreign exchange trading. Besides, there are undesirable effects of exchange rate volatility on the economy, and the interdependence of money and monetary policies worldwide and the transmission of effects through the markets narrow the authorities' scope of action. Central banks are often tempted to try to limit exchange rate fluctuations by means of direct intervention. The Bank of Japan is up to becoming one of the most 'innovative' players in this field. However, the prospects in this area depend on the degree of international policy cooperation reached.

9

EXCHANGE RATE STABILISATION

In general, a central banks scope to influence the exchange rate is restricted in two respects. On the one hand, there are domestic institutional constraints. Usually a central bank is not fully autonomous but under the control of the government or finance ministry of its country and in one way or the other expected to follow their instructions. On the other hand, there are international constraints. Nowadays the economies of major industrial countries are highly interdependent and economic policy decisions in one country influence the outcome in all others.

CENTRAL BANK INTERVENTIONS

Empirical studies have shown that, in general, the success of central bank policy as measured by its inflation record is strongly related to its degree of independence from government (Eijffinger and Schaling 1995). However, there is one exception: with respect to price stability the Bank of Japan is one of the most successful central banks in the world (see Table 9.1). But its degree of formal independence is very low.[1]

This holds in particular for its exchange rate policy. Whenever the Bank of Japan is intervening in the foreign exchange market it is formally acting on behalf of the Ministry of Finance under the Foreign Exchange Fund Special Account (FEFSA).[2] Initially, this account has been established to manage the government's foreign funds in general. Accordingly, foreign exchange reserves are not the only item there. Table 9.2 shows the composition of the FEFSA's assets and liabilities as of 31 March 1992.

On the asset side, international reserves totalled ¥9,244.9 billion. Another large entry was accumulated book losses which amounted to ¥6,097.2 billion. A special feature of the FEFSA is that, in contrast to the practice in other countries, book losses from marking foreign assets to market are not formally transferred to the government's central budget but kept in this account forever which effectively amounts to valuating the inherited stock of assets at historical exchange rates (Glick and Hutchison 1994:232). The third large item is yen assets the bulk of which are deposited with the Trust Fund Bureau. This

Table 9.1 Long-term inflation records in major industrial countries*

Country	*Inflation rate in %*	*Rank*
Germany	3.8	1
Czechoslovakia	4.0	2
Switzerland	4.1	3
Netherlands	4.7	7
Japan	5.3	11
United States	6.3	17
Canada	7.1	23
France	7.8	31
United Kingdom	9.9	55

* Annualised twenty-year inflation rates.
Source: Deane and Pringle (1994: Appendix)

Table 9.2 Foreign Exchange Fund Special Account balance sheet[a]

Assets		*Liabilities*	
International reserves		Foreign exchange fund bills	15,446.0
• gold	54.3	Liabilities to IMF	635.1
• deposits and securities	8,117.0	SDRs allocated	158.8
• IMF reserves	1,073.6	Other liabilities	0.0
Book losses		Total reserves	
• accumulated	6,097.2	• funds	378.6
• current	642.7	• reserves	7,041.3
Yen assets		Net income, fiscal 1991	289.2
• deposits with the BoJ[b]	179.6		
• Trust Fund Bureau	7,239.4		
• loans to government	531.6		
• other	13.7		
Total	23,949.0	Total	23,949.0

a As of 31 March 1992, in billions of yen.
b Estimate.
Source: Neumann (1996:117, Table 2)

reflects the fact that over the years the FEFSA has become an important channel for the finance of public spending programmes (Neumann 1996:117). Being the major source of funds for the Japanese Fiscal Investment and Loan Program (FILP)[3] the Trust Fund Bureau finances public investments and public corporations.

On the liabilities side, the dominant source of finance is the issuance of Foreign Exchange Fund (FEF) Financing Bills *(tameken)* which are offered in public auctions. However, being relatively unattractive to commercial banks with a fixed interest rate below the official discount rate the Bank of Japan

underwrites close to 100 per cent of new issues (Kawamura 1996:91, Neumann 1996:116). The amount of net outstanding FEF Bills has risen steadily since the scheme was introduced in 1973. In February 1996 it was about ¥24 trillion or 10.8 per cent of the amount outstanding of ordinary government bonds. The Bills are not only held by the Bank of Japan, but by the Trust Fund Bureau, the National Debt Consolidation Fund, the Post Office Life Insurance scheme, the Postal Savings scheme[4] and, before privatisation, even the Japanese National Railways (Table 9.3).

If not sterilised central bank interventions affect the monetary base and thereby may hamper domestic money control. By definition, the monetary base, on the sources side, consists of domestic assets and international reserves held by the central bank. Sterilisation means that official purchases and sales of foreign assets are compensated by a corresponding decrease or increase in domestic assets thereby leaving the monetary base unchanged. In Japan, the Bank of Japan's interventions in the foreign exchange market through the FEFSA involve fund transfers between the FEFSA and the commercial banking sector which directly alter the monetary base. For example, if the Bank buys dollars it raises the necessary yen funds by issuing foreign exchange bills through the FEFSA. It purchases the bills on its own account. Thus, in the consolidated account of the Bank of Japan and the FEFSA both amounts cancel out and in order to absorb the yen funds to sterilise the impact of the dollar purchases on the monetary base the Bank of Japan has to sell domestic securities such as government bonds, financing bills or treasury bills (Glick and Hutchison 1994:255–6).

The Bank of Japan's power to influence the exchange rate does not only depend on the direct restrictions on official interventions but also on the general relations between government and central bank. There are at least four aspects. The first is the position in law. Under Article 42 of the Bank of Japan Law the Ministry of Finance supervises the Bank of Japan, under Article 43 it can 'order the bank to undertake any necessary business' (Deane and Pringle 1994:259).

Table 9.3 Outstanding Foreign Exchange Fund Financing Bills*

Year	*Total*	*Bank of Japan*	*Trust Fund Bureau*	*Postal Life Insurance*	*National Debt Consolidation Fund*	*Japanese National Railways*	*Postal Savings*
1973	1,791.07	529.86	690.29	45.08	122.28	83.21	–
1975	2,663.48	711.07	1,293.50	76.48	301.58	32.16	–
1980	8,579.71	3,995.11	2,678.69	49.11	1,109.32	58.18	–
1985	8,595.84	6,067.42	135.83	2.57	789.91	356.26	–
1990	16,136.34	10,622.55	253.48	4.88	1,693.63	–	4.11
1994	20,671.58	13,345.07	276.49	0.00	3,758.27	–	4.73

* In billions of yen.
Source: Kawamura (1996:99, Table 5)

The Minister of Finance has the power to (arbitrarily) dismiss directors of the Bank of Japan (Okina 1997:44).

The second aspect is monetary policy. Although there is close contact between the Ministry of Finance and the central bank the final responsibility for monetary conditions is considered to be with the Bank of Japan (Suzuki 1989:314). This gives the Bank some scope for circumventing restrictions on foreign exchange interventions as well, because, in principle, no one can prevent it setting interest rates with regard to an exchange rate target thereby triggering respective capital flows. Therefore, the final outcome of both monetary and exchange rate policy can be considered to be more or less the result of a tacit bargaining process[5] with all formal arguments on the Ministry's side and the factual ones more on the Banks.

Third, personalities matter. This is apparent since Yasushi Mieno, who became governor of the Bank of Japan in 1989, turned out to be a strong fighter for a greater autonomy of his institution (Deane and Pringle 1994:247). Personal relations between the Bank and the Ministry of Finance are established through a variety of channels and, among other things, as critics remark, strengthened by the 'customary right of the Governor of the BOJ to make nepotistic personnel appointments from among former members of the Ministry of Finance and the BOJ' (Okina 1997:44).

Fourth, the regulatory environment matters as well. There is widespread agreement that since the 1980s the balance of power between the Bank of Japan and the Ministry of Finance regarding the process of decision making and implementation of monetary policy has shifted and that the Bank's dependence has been reduced. This is explained by the fact that the influence of the Ministry of Finance is mostly based on the 'regulatory leverage' which has declined during the liberalisation process while the Bank of Japan derives its influence above all from a 'market leverage' (Eijffinger and van Rixtel 1992:307).

Both institutions also differ sometimes with respect to their goals. For example, while, in principle, the Ministry of Finance attaches greater weight to economic growth, the Bank of Japan traditionally has a strong focus on price stability (Eijffinger and van Rixtel 1992:307). However, at times, its decisions are determined by other motives as well. In particular the weaknesses in Japan's banking sector led the Bank to take several unusual measures. In maintaining a loose monetary policy and low interest rates it enabled banks to borrow funds at low costs which they could then reinvest in government bonds securing them at least some riskless profits to make loan-loss provisions.[6] Similar strategies were said to be tried in the currency markets. There was some evidence that, at times, the Bank of Japan undertook interventions to weaken the yen in an attempt to support banks exposed to the 'Japan premium' which was increasing their costs of borrowing in international markets and even lent dollars it had raised in the markets from its own funds directly to troubled institutions (compare Baker, G. 1995d, e).

In February 1997, a Japanese finance ministry advisory panel presented its

long-awaited proposals for a comprehensive revision of legislation governing the Bank of Japan (Ministry of Finance 1997). From April 1998 on, monetary policy will be set by a nine-person policy board of members drawn partly from business and academia instead of the two bodies[7] ruling when this book went into print. Government officials will be able to attend the meetings and submit proposals, including the case for delaying decisions until the next meeting, but have no voting rights. For the first time, monetary policy will have two clear objectives: it will be responsible for price stability and for maintaining an orderly credit system. The Bank's role as lender of last resort will be clarified. It will be able to bail out solvent banks by means of collateral-free loans in case of computer crashes or other accidents, while insolvent institutes will remain the responsibility of the Ministry of Finance. There will be a greater transparency of operations. The Bank of Japan will report twice a year to the Diet instead of once as now and will submit records of policy board meetings and a detailed summary of its overall activities at the end of the fiscal year (Dawkins 1997, Robinson 1997).

Critics say that the proposals represent only a modest reduction in the Ministry's power (Dawkins 1997, *The Financial Times* 1997). The Bank of Japan will be legally free to set interest rates, which is more or less a confirmation of the prevailing practice, but still must closely cooperate with the Ministry. It will have to ensure that 'there is sufficient mutual understanding to secure consistency between the government's economic policy and its monetary policy' (Ministry of Finance 1997:1). Thus, as before, much will depend on personalities on both sides.

Besides the money supply since the transition to managed floating in the early 1970s the US dollar/yen exchange rate has been one principal target of monetary policy in Japan (Nakao and Horii 1991:11). Over the years the Bank of Japan mostly conducted a leaning-against-the-wind policy buying foreign currency when the yen appreciated and selling it in case of depreciation (Watanabe 1994:274–7). However, its policy was not always symmetric with respect to depreciations and appreciations. For example, during the first years after the breakdown of the Bretton Woods System, being mainly concerned with the dangers of inflation the Bank of Japan tended to intervene more rigorously in times of yen depreciation (Ogata 1982). In contrast, during the yen appreciations between April 1986 and March 1989 the Bank of Japan was observed to buy foreign currencies when the yen appreciated but did not intervene in times of a falling yen. The picture changed again from April 1989 to May 1992. Then, the Bank obviously intervened against a depreciating yen but did nothing to prevent a yen appreciation. One interpretation of these shifts in strategy is that the Bank of Japan had a target exchange rate which was changing over time with interventions taking place as soon as deviations from that target became too large (Watanabe 1994:285).

From time to time the question arises whether foreign exchange market interventions have lasting effects on the exchange rate at all. Traditional

theories of exchange rate determination are rather sceptical in this respect. Except under very special circumstances they see the scope of central bank influence limited to the case of non-sterilised interventions.[8]

In a world of highly mobile capital and efficient financial markets, with financial assets being perfect substitutes and market participants acting under rational expectations, international arbitrage guarantees that exchange rate changes always correspond to changes in interest rate differentials adjusted by changes in the expected future exchange rate. Accordingly, in a small country facing a given world interest rate any purchase or sale of foreign currency by the central bank can only lastingly influence the exchange rate when it affects either the domestic interest rate via a change in the money supply or the market s expectations of future exchange rate changes where, usually, only expected changes in the path of the future monetary policy are considered as relevant 'news'. Market participants observing the official intervention revise their expectations of future monetary policy which then appears consistent with the changed exchange rate (Watanabe 1994:258).

When the central bank has a monetary target it will want to sterilise the intervention effect on the monetary base and the domestic interest rate will not change. But, in this case, the intervention itself does not bear any relevant new information for the market either. Even if sterilisation does not take place at once the immediate exchange rate effect of the policy action is not credible because market participants expect the central bank sooner or later to revise its strategy to meet the monetary target. In this scenario, the only possibility for the authorities to have a lasting effect on the exchange rate is to leave the intervention unsterilised thereby trying to signal credibly an intended change of monetary policy.

Besides this signalling channel[9] there is a portfolio channel through which sterilised interventions work as soon as domestic and foreign assets are considered as imperfect substitutes, a scenario developed in the portfolio-balance models of the 1970s.[10] In this case, investors are assumed to diversify their holdings among domestic and foreign assets as a function of expected risks and returns. Foreign exchange interventions then alter the supply of domestic relative to foreign assets held by the market and thereby make the exchange rate change last. For example, if they buy foreign currency and compensate the corresponding rise in the domestic money supply by selling domestic assets they increase the supply of domestic relative to foreign assets in private portolios, investors will require a higher expected return on domestic assets to become willing to hold the additional stocks and the domestic currency will depreciate (Dominguez and Frankel 1993:58). But, so far, little empirical evidence has been found for this channel (Lewis 1995:185, Watanabe 1994:258).

The signalling hypothesis can be broken down into two parts (Watanabe 1994:259). The first refers to the central banks optimising behaviour, the second to the formation of market expectations of future monetary policy. Studies of Japan, concentrating on the first effect, have identified several

periods in which a change in the Japanese discount rate standing for the Bank of Japans monetary policy was preceded by respective official sales and purchases of foreign currency which is regarded as an indication that besides a leaningagainst-the-wind policy, signalling, at least at times, played an important role as a motive for currency interventions.

Between 1973 and 1992 at least four turning points of monetary policy in Japan have been identified which were signalled by respective changes in intervention strategies from sales to purchases of US dollars or vice versa.[11] But, on the other hand, there were also many instances in which a change in the official discount rate was not consistent with the direction of the interventions which was explained by the Bank of Japan giving priority to stimulating economic activity in those situations. One conclusion drawn was that 'when the stability of the foreign exchange rate becomes relatively less important as a policy objective, the Bank of Japans monetary policy tends to deviate from the course implied by preceding interventions' (Watanabe 1994:268).

If the studies do not manage to draw a coherent picture of the motives and effects of central bank interventions one reason may lie in the simplicity of the underlying theoretical models. With respect to Japan, most of the assumptions made appear far too restrictive. First, this is not a small country in the sense that developments here have no influence on world markets and other countries' economies.[12] On the contrary, changes in Japanese interest rates and the yen exchange rate can be expected to have effects and repercussions in both foreign and domestic markets, although they may not be well understood in their variety. They may alter the desired composition of investors' portfolios and influence expectations through other channels than the ones described.

Second, knowledge in the market is incomplete. For example, if the Bank of Japan has an exchange rate target it is unobservable to market participants (Watanabe 1994:285). In general, relations influencing market outcomes are far too complex to be perfectly known. Therefore, private actors can be thought rather as optimising their search for limited information instead of aiming at the full picture.[13]

Third, expectations may be 'irrational' in the sense that market participants differ in their judgements of economic relations and developments simply because they rely on different models of the economy,[14] or because they take other than economic influences into account. For example, if it is true that expectations are heterogeneous and influenced by a wide variety of data, and if some decisions are based on technical analyses rather than on fundamental economic models, then there is ample scope for central bank policy to influence market behaviour, either by directly affecting expectations or by altering the path of past exchange rates thereby changing the 'patterns' generated by technical models. As demonstrated earlier, there are indications that the latter holds particularly for the Japanese market. In practice, the problem rather appears to be that interventions are but one influence in the daily tide of news flooding the markets and that, usually, the amounts involved

are small compared to general transaction volumes. But, these are arguments for a bundling of central banks' efforts rather than against the general effectiveness of interventions.

One possibility of directly judging the success of official interventions often referred to in the literature is to measure their profitability. The argument goes back to Milton Friedman. It says that in successfully stabilising exchange rates central banks accumulate international reserves because on average they buy their own currency when it is low in price and sell it when it is high (see Friedman 1966:174–6). Along this line of reasoning, the intervention policy of the Bank of Japan has proved particularly successful since the late 1980s (Table 9.4). In international comparison, Japan's reserves have shown the biggest increase in recent years amounting to $206 billion in 1996 (*The Economist* 1997).[15]

Recently, Japan's high level of foreign reserves has been criticised as excessive (see Kawamura 1996). They are largely considered as idle cash which is not only carrying an undue exchange risk but could also be invested productively elsewhere. In addition, interventions are not as profitable as often thought because usually, so the argument goes, the procurement costs of the yen-based funds for interventions are not taken into account, i.e. the opportunity costs of holding Foreign Exchange Fund Financing Bills at a low yield. There are estimates that, including these costs which, in principle, are borne by all institutions holding the bills, the cumulative gain of official interventions resulting from official foreign currency holdings would turn into an overall cumulative loss which from the transition to floating rates to 1995 made about ¥600 billion (Kawamura 1996:98).

In general, it is difficult to determine the appropriate reserve level. There are mainly two motives for holding foreign exchange reserves, to pay for a country's imports and debt service and to meet temporary gaps in the demand and supply of foreign exchange. The more open an economy and the greater the variability of its trade the greater a country's need for foreign reserves. The stronger a currency's role in international transactions the greater the central bank's need for ammunition to defend its value against foreign exchange speculation (*The Economist* 1997).

Table 9.4 Foreign exchange reserves in international comparison[a]

Year	*Japan*	*United States*	*United Kingdom*	*Germany*[b]	*France*
1986	43.29	48.67	19.24	55.81	34.96
1990	79.71	85.30	36.80	72.64	40.85
1995	184.51	88.40	42.97	89.96	31.11

a Year-end values, in billions of US dollars.
b From 1990 onward for the united Germany.
Source: Bank of Japan (1994, 1996c: Table 75)

So far, the Bank of Japan neither cares about the critiques nor does it share the above-mentioned reservations about the effectiveness of interventions. It regularly intervenes in the market, not only in times of crisis, and, in contrast to most other central banks, it is often involved in heavy interventions most of which are sterilised (Walmsley 1983:46, Takagi 1991b). There is a Japanese proverb saying 'the first hour of the morning is the rudder of the day' (Nison 1991:25) and the Bank is acting accordingly. Although its presence is felt in the market the whole day long throughout the trading periods, except during the local lunchtime hour, the majority of interventions usually take place right at the market opening signalling the authorities' views and intents (compare Goodhart and Hesse 1993:375). Again, this is in stark contrast to the behaviour of central banks in Europe and North America which tend to wait to see how prices will develop in the course of the day.

The difference in attitudes is also demonstrated by the Bank's view of derivatives in this context. Usually, considering the macroeconomic effects of those instruments worries prevail among central banks focusing on four aspects (Crockett 1995:54–9). First, there are fears that the availability of derivatives could affect the behaviour of economic agents and their reaction to traditional price signals and that, finding it easier to hedge against unexpected developments such as short-term changes in interest rates and foreign exchange rates, the agents may become less responsive to traditional macroeconomic policy instruments. Second, derivatives may influence market behaviour in changing the speed and volatility with which prices adjust to unforeseen events. There are obvious implications for the transmission mechanism of monetary policy: due to the existence of those instruments linkages between short-term money markets and other financial markets have strengthened and, at the same time, become more complex. Thus, 'changes in the official policy stance no longer have direct and unambiguous effects on other markets' (Crockett 1995:57).

A third worry concerns the implications of derivatives for the reliability of monetary policy indicators. For example, the direction of their impact on the demand for money balances is unsure. On the one hand, the growing volume of transactions that need to be settled with the increase of derivatives trading seems to imply a greater need for money balances. On the other hand, the greater capacity to hedge risks, and to transfer risks with minimal holding of underlying assets, may reduce this need. Fourth, there are concerns that derivatives may change the effectiveness of the traditional instruments of monetary policy. With the existence of new instruments intervention effects are more widely diffused and specific influences on a particular market resulting from former market segmentation may be reduced.

However, there is still another aspect. Derivatives can also be used as tools of monetary policy, either as instruments for direct interventions or as an indicator of market sentiment. Central banks have been criticised for their intervention practices which compared to the sophistication financial markets developed over the last twenty years have been called 'anachronistic' (*The*

Banker 1996d). Due to their leverage derivatives could be used either to improve the effectiveness of interventions or achieve the same results as before without undesirable domestic liquidity effects which otherwise had to be sterilised. One argument against their use for intervention purposes is that they tend to 'conceal the costs of a policy that turns out to be unsustainable. Given the experience that exchange rate policies can sometimes be driven by political objectives, it is not obviously desirable to facilitate resistance to market pressures' (Crockett 1995:59).

While most G7 central banks are hesitant about making use of derivatives (Deane and Pringle 1994:310) the Bank of Japan has made several advances in this direction. It is closely monitoring developments in the derivatives market focusing on currency options. Based on market participants' daily reports of delta values which it takes as an indicator of the pressures expected to be exerted on particular currencies the Bank is operating in the spot market in anticipation and prevention of those pressures (compare also Inose 1994b). In addition, it has begun to study the possibilities of intervening directly in the derivatives market.[16]

INTERNATIONAL POLICY COOPERATION

Despite, or perhaps because of, the strength of central bank activities, in Japan, the current state of the system of managed floating is widely considered as unsatisfactory. The main argument is asymmetry. The days of Plaza and Louvre seem gone. The G7 countries are divided by diverging economic developments and conflicting views and interests, and their meetings appear as loose informal gatherings with little or no impact on currency markets. With respect to foreign exchange interventions Japan is regarded as bearing an overproportionate burden. For example, there are estimates that, in 1993, the total amount of yen/ dollar interventions by the Bank of Japan was 17 times higher than that of the Federal Reserve, in 1994 it was 8.3 times higher and in 1995 17.3 times (Kawamura 1996:85). In part, the amounts reflect differences in attitudes. As a rule, Western central banks rarely appear to rely on any signalling effects whatsoever and, with regard to the volumes trades betting against them may reach, shun frequent interventions considering them to be most effective when they are undertaken in secret and sporadically taking the markets by surprise.

Japan's economy appears particularly vulnerable to exchange rate changes. This holds not only for its trade but perhaps even more for its financial relations. Japans foreign assets are to a large extent denominated in US dollars, a situation critics in Japan regard as quite abnormal.[17] That the world's largest creditor country is holding most of its foreign assets in the currency—and under control—of the world's largest debtor country, and being the one bearing the currency risk appears hard to accept to some Japanese observers (compare Nihon Keizai Shimbun 1995a). Accordingly, the Japanese government

is showing the most urgent interest among all G7 countries to revise the current exchange rate system, pressing for a greater international role of the yen as well as for mechanisms to strengthen currency interventions.

In principle, there is widespread agreement about the benefits of international cooperation. The theoretical rationale behind the coordination of monetary policies has its origins in game theoretic analyses emphasising the strategic interdependence of countries. Since those studies had a considerable influence on the debates about the future of the world monetary system in recent years it is worth having a closer look at their main lines of reasoning.

In the technical academic literature monetary cooperation is defined as coordination of policy variables[18] with policy makers in one country recognising the objectives and prospective actions of policy makers in other countries in defining their own actions. Their decision-making problem can be best demonstrated in a graphical presentation. Figure 9.1 shows the tradeoff each of them faces. It shows the decision-making problem of one country which has one instrument to realise two conflicting targets, T_1 and T_2 with its 'bliss point' B assumed to represent the realisations and weights[1] ideally[2] attached to both.

The country's policy outcome depends not only on its policy maker's own decision but on strategies chosen in other countries as well. In a two-country world, for each policy of the other country the first one ends up on a different possibility frontier AA, and its optimal strategy is determined by the point of tangency to a respective indifferent curve which represents all possible combinations of targets of equal utility level. Connecting the points of tangency of all possibility frontiers would give the country's reaction function for its optimal instrument setting in dependence of the other country's policy.

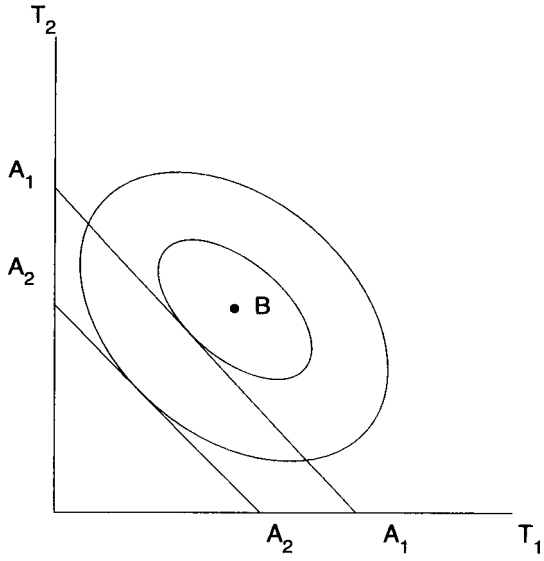


Figure 9.1 Conflicting targets

Figure 9.2 shows the reaction functions of two countries, R_1 and R_2, in dependence of their own and each other's instruments for the classic case[1] in which both try to pursue a beggar-my-neighbour policy. Both expect a negative transmission of policy effects and prefer the other to bear the main burden. They have two possibilities: to cooperate or not to cooperate. Without cooperation each country tries to anticipate the other's strategy and by adjusting their own policy respectively both end up in the so-called Nash equilibrium which is represented by point N. This is a very unfavourable situation. Obviously there are many combinations of instruments where both countries could reach a better outcome on a higher indifference curve.[19]

In order to understand why the 'players' behave in this way it is necessary to recall the static nature of this 'game'. The two policy makers are assumed to act once and at the same time. They have perfect information and there is no 'preplay communication'. If one of them chooses a point on his reaction curve higher than N, his counterpart would try to exploit the situation by reoptimising and adopting a strategy which would lead him to a point on his reaction curve respectively leaving the first one with a suboptimal outcome.

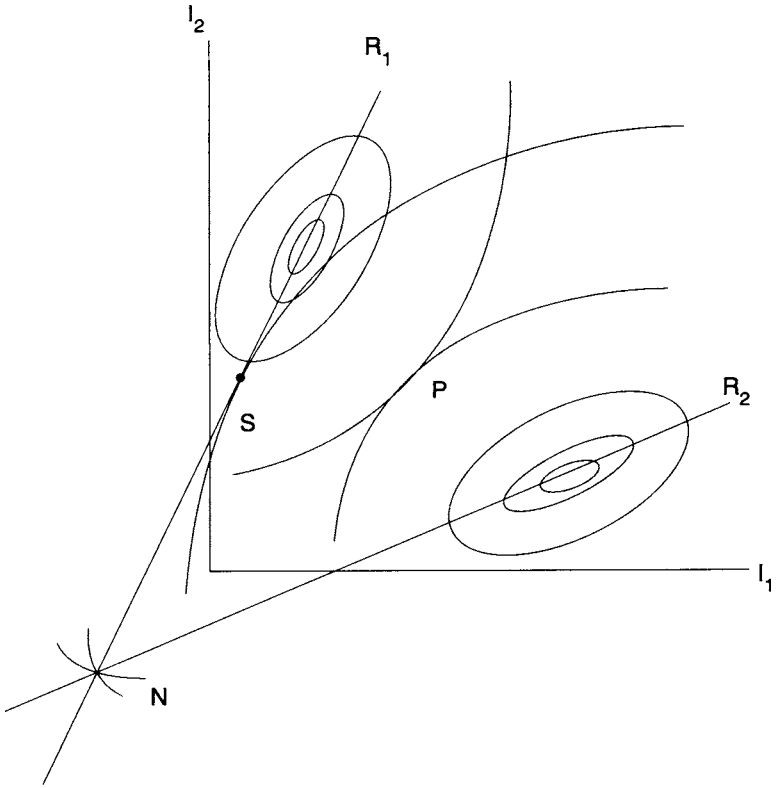


Figure 9.2 Cooperative and non-cooperative solutions

However, the principal objective both have is to avoid suboptimality. For them there is only one solution: to choose a strategy which guarantees an optimal outcome for both at the same time hindering the other to reoptimise. But, this is only the case in N.

If the assumption of a 'one-shot game' is abandoned, policy makers become able to cooperate, bargaining for a compromise step by step. In the literature, such a compromise would (Pareto) optimally[20] lie on a line that connects the countries' bliss points tracing out points of tangency of each one's indifference curves. For example, if both countries decided to divide the costs of cooperation more or less equally between them they could optimally end in point P of the figure. However, such a situation would be highly unstable. Once convinced that the other would behave accordingly each country would have a strong incentive to defect and reoptimise and to try to get away with a non-cooperative policy at the other's cost.

Another solution discussed in the literature, in particular in the context of regional monetary policy cooperation, is an asymmetric one where one of the 'players' takes the lead and tries to increase the utility of both by choosing a strategy which guarantees an outcome on the other's reaction curve. In Figure 9.2 such a so-called Stackelberg-solution is represented by point S where country 2 has assumed the leadership role and country 1 has become the follower.

In this game, under certain circumstances, it may pay for a country to wait for the other to take the lead. In point S in Figure 9.2 the first country comes out with a higher utility than the second. On the other hand, there is the danger that if each is waiting for the other to take the first step both end up in an indeterminate situation. Another problem arises if both want to be a leader. There are constellations where the Stackelberg-follower would be considerably worse off than in the Nash-equilibrium. Whether the leader could realise his strategy in this case must be doubted. Instead, it seems more probable that under these circumstances both try to take the initiative ending in a disequilibrium known as Stackelberg Warfare (see Rasmussen 1990:82).

Empirical studies based on these concepts confirm that there are benefits from policy coordination.[21] However, they also show that these depend strongly on the chosen scenario. The gains may be small and not equally distributed among countries. Perhaps this helps to explain why the enthusiasm for a more formalised monetary policy cooperation is not particularly strong among G7 countries.

Over the years, there have been a number of attempts to develop institutional mechanisms for greater stability of exchange rates worldwide. Among the earliest were the IMF 'Guidelines for the Management of Floating Exchange Rates' established in 1976. They had very little impact (Crockett 1996:560). Another approach was the system of 'objective indicators' to monitor unsustainable economic developments and policies which was developed by the G7 in the mid-1980s. The latest initiative was the establishment of the Bretton Woods Commission in the early 1990s, an international panel of

financial experts chaired by Paul Volcker, former chairman of the US Federal Reserve Board, which stressed the need for greater economic convergence and stability of major industrial economies and for a more formalised exchange rate system under the auspices of the IMF (Minton-Beddoes 1995:129).

In general, the discussion about what kind of system to choose centres around two concepts developed in the 1980s: the McKinnon approach and the targetzones proposal.[22] The theoretical rationale underlying the McKinnon approach starts from the assumption that national prices are more correlated with the aggregate world money supply than with national monetary aggregates and that inconsistencies in national monetary policies and the resulting disparities in purchasing power are the main sources of exchange rate fluctuations. Therefore, McKinnon proposed to coordinate the monetary policies of at least those countries whose currencies are internationally more or less considered as close substitutes and to determine jointly their money supply. In practice, this would mean a joint monetary policy steering the weighted sum of the national money supplies of the United States, Germany and Japan. Further, since this policy could not be expected to prevent short-run fluctuations in exchange rates additional foreign exchange market interventions to keep rates within a narrow band around a given parity would support the system.

The proposal leaves many problems unsolved (see also Hamada and Patrick 1988:134–5). For example, with its strong emphasis on the relationship between money, prices and exchange rates it does not tell how real disturbances are to be handled. However, the main difficulty lies in the formulation of a joint monetary strategy requiring all three countries to give up much of their national autonomy. For instance, each time Germany or the United States decided, perhaps in reaction to some unforeseen disturbance, to increase their money supply beyond the agreed target Japan would more or less automatically have to turn to a more restrictive policy. This appears difficult to accept for an economy in which monetary relations are governed by the principles of consensus formation and the search for 'mutual understanding' of the actors involved.

In contrast to the McKinnon proposal the target zones approach aims at coordinating monetary as well as fiscal policies in the United States, Europe and Japan. According to this approach exchange rates would be kept within narrow bands, the target zones, around a so-called Fundamental Equilibrium Exchange Rate (PEER) by means of official interventions supported by appropriate fiscal and monetary policy measures. The determination of the band, and the formulation of policy strategies, would be decided on the basis of a set of economic indicators and, as far as possible, consider the needs and requirements of each country concerned. For example, if in a scenario of worldwide inflation Japan's economy would suffer from a weak domestic demand and, at the same time, the yen would stick to the lower end of its band, the Japanese authorities could be asked on the one hand to pursue a restrictive monetary policy in support of the yen and on the other to increase public expenditure, or lower taxes, in order to stimulate the domestic economy.

One of the difficulties here would be to agree among the participants on a 'true model', that is on a theoretical concept for determining the FEER and its relation to the various indicators. In addition, because of the greater number of transmission channels and decision makers involved in each country, this proposal would pose more challenges for economies governed by complex informal political processes and structures than the McKinnon approach.[23]

There is still another difficulty. In principle, both concepts for a tripolar worldwide policy cooperation centred on the US dollar, the D-mark and the yen implicitly assume that the Japanese currency is playing a similar role in international financial relations as the other two. However, as recent studies have shown, this is definitely not the case.[24]

The literature lists some general prerequisites for a currency to fulfil an international function. Besides political stability of the issuing country, the currency must have a comparably stable purchasing power, its financial markets should be broad and have a wide range of instruments, they should be deep with well-developed secondary markets, and with few capital and exchange controls (Tavlas and Ozeki 1992:2–3).

These conditions do not guarantee that a currency will actually be used internationally. In fact, the criteria for what makes an international currency are somewhat arbitrarily chosen reflecting the 'fuzziness' of the term 'internationalised' (Garber 1996:2). It is generally accepted that a currency can serve three purposes, as unit of account, means of payment and store of value.[25] In an international context, for each of these functions it seems useful to distinguish between private and public use (Table 9.5). This gives six cases and in most of them the yen shows a rather weak performance.

The extent to which a currency serves as a unit of account for the private sector can be seen in its use as an invoice currency in international trade. With respect to this measure, Japanese exporters' behaviour showed remarkably few changes over time (Table 9.6). For example, in September 1994, the share of Japanese exports denominated in yen worldwide was about 39.7 per cent[26] which is clearly higher than in 1988 when it accounted for only 34.3 per cent but differs not much from that in 1983 when it had already

Table 9.5 Functions of an international currency

Function	*Private sector*	*Official sector*
Unit of account	Currency used in invoicing merchandise trade	Currency used in defining parities
Means of payments	Vehicle currency in foreign exchange markets	Intervention currency in foreign exchange markets
Store of value	Currency in which deposits, loans and bonds are denominated	Currency in which reserves are held

Source: Kenen (1983: Figure 1)

Table 9.6 Share of yen denomination in Japan's foreign trade*

Year	*Denomination of exports*		*Denomination of imports*	
	Southeast Asia	*All regions*	*Southeast Asia*	*All regions*
1983	48.0	40.4	2.0	3.0
1986	37.5	35.5	9.2	9.7
1987	36.3	34.7	13.9	11.6
1988	41.2	34.3	17.5	13.3
1989	43.5	34.7	19.5	14.1
1990	48.9	37.5	19.4	14.4

* In per cent.
Source: Frankel (1993:80, Table 2.13)

stood at 40.4 per cent. For the import side, the share of yen denomination worldwide has increased drastically from 3.0 per cent in 1983 to 19.2 per cent in 1994. Nevertheless, compared to the share of the domestic currency in foreign trade in European countries and the United States the numbers for Japan for both imports and exports appear extremely low.[27]

On the other hand, the data in a sense hint at a kind of regional bloc building in that in Southeast Asia the share of trade denominated in yen was always higher than worldwide. Here again, the development shows a remarkable increase on the import side over the years while the share of yen denominated exports remained more or less constant in the longer run. However, this case of 'regionalisation' should not be overstated. To many observers, the role of the Japanese currency appears still not proportionate compared to Japan's share in regional trade, and intra-regional trade in Asia itself is still much smaller than, for example, in the European Community (Frankel 1991, 1993).

The public function as a unit of account can be seen in the role the yen plays as a currency used in defining parities. Although the yen, like the D-mark, is part of several currency baskets—including the special drawing right (SDR), a basket of five major currencies[28]—in contrast to the D-mark and the US dollar there is no single country that has pegged its currency formally or informally to the yen. With respect to Asian countries, Thailand and China officially peg their currencies to a basket containing considerable yen as well as dollar shares. Other countries in the region like Singapore, South Korea, Indonesia and Malaysia follow a system of managed float, Taiwan and the Philippines have fully flexible exchange rates and Hong Kong—although not an official member of the IMF—is pegging its currency to the US dollar (Table 9.7).

But, the official arrangements do not show the full picture. For example, for Indonesia and the Philippines the rupiah and the peso were observed to be 'both managed tightly in terms of their US dollar exchange rates over a short time horizon, while they have shown significant trend depreciation over a longer horizon…their exchange rate system may more appropriately be classified as a crawling peg to the dollar' (Takagi 1996:4). In addition, comparing the actual

Table 9.7 Exchange rate systems in Asia

Country	*Exchange rate system*
Hong Kong	pegged to the US dollar
Singapore	managed float
Taiwan	free float
South Korea	managed float
Malaysia	managed float
Thailand	linked to a currency basket
Indonesia	managed float
Philippines	free float
China	linked to a currency basket

Source: Bank of Japan (1996c: 177–8), Niederer (1994:2, Table 1)

moves of East Asian currencies in reaction to changes in the yen/dollar exchange rate in times of high fluctuations their response turned out to be much stronger than implied by econometric estimates of the yen in nominal exchange rate determination (Takagi 1996:22–3). Those responses had not been symmetric. For instance, the Korean won and the Malaysian ringit appeared to be tied more strongly to the yen when it was depreciating which was interpreted as a hint to the countries' emphasis on export promotion. In contrast, the Singapore dollar tended to move more closely with a rising yen indicating a stronger preference for price stability by the Singaporean monetary authorities.

With respect to a currency's role as store of value, there are several possible indicators. One measure often used is the currency composition of international securities issues (Table 9.8). Although the numbers fluctuate considerably there is a clear tendency that in recent years the Japanese yen has replaced the D-mark as Number Two behind the US dollar. And, although the dollar stocks at the end of 1995 are still double the amount of yen stocks, since 1994, the volume of new issues in yen is much higher than in dollars. However, as has been demonstrated earlier, this is only partly explained by a shift in international investors' preferences. In part it is the result of liberalisation measures in Japan designed to promote investment in foreign securities (Bank

Table 9.8 The currency composition of international securities issues*

Currency	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*Stocks at end-1995*
US dollar	56.0	54.9	58.9	31.5	73.7	74.9	984.9
Japanese yen	28.9	21.1	9.2	33.8	106.8	108.3	496.8
D-mark	9.4	12.6	24.6	31.2	27.5	55.9	319.7
Others	69.8	116.0	58.7	101.1	77.6	74.0	1,001.9

* International bonds and euronotes, in billions of US dollars.
Source: Bank for International Settlements (1996b: 147)

for International Settlements 1996b: 152), and in part it reflects a strong demand for yen issues from Japanese investors who are shunning currency risk after experiencing huge losses during the first *endaka* or yen appreciation.

In the public realm, a currency's use as store of value can be seen in the currency composition of official foreign reserves. Here, the dollar's global share had stayed remarkably stable in the 1990s remaining about two-thirds at the end of 1995. This came as a surprise to many observers who had expected countries worldwide to diversify their reserves away from the US currency. But, the global numbers hide two opposite tendencies. In fact, there was some degree of diversification—from which the yen clearly benefited (see also Ikenaga 1996:5)—but its effects were compensated for by developing countries who stocked up on their dollar reserves, a tendency which was reinforced by industrial country investors' mounting interest to buy into emerging markets (Bank for International Settlements 1996b: 106).

The yen's use as international means of payments in the private sector is demonstrated by the currency composition of global foreign exchange market turnover (Table 9.9). If a German bank in London wants to buy Japanese yen against D-marks, normally, it first has to buy dollars with its D-marks and then buy yen with the dollars. This use of the dollar as vehicle currency for crosstrading other currencies is one reason for its dominance worldwide. Respectively, its official function as intervention currency for central banks and governments is equally strong. Nowadays, the US currency is involved on one side in more than 80 per cent of all foreign exchange transactions. But, the numbers also show that this share has been shrinking since the end

Table 9.9 Currency composition of gross foreign exchange market turnover[a]

Currency	*April 1989*	*April 1992*	*April 1995*
US dollar	90	82	83
D-mark[b]	27	40	37
Japanese yen	27	23	24
Pound sterling	15	14	10
French franc	2	4	8
Swiss franc	10	9	7
Canadian dollar	1	3	3
Australian dollar	2	2	3
ECU	1	3	2
Other EMS currencies	3	9	13
Currencies of other reporting countries	3	3	2
Other currencies	19	8	8
All currencies	200	200	200

a The figures relate to gross turnover to show longer-term shifts in currency composition, because data on a net basis are not available for 1989. This is the reason why the data add to 200 per cent. b The data for 1 989 exclude domestic trading involving the D-mark in Germany. *Source*: Bank for International Settlements (1996a: Table F–3)

of the 1980s. However, the decline took place largely at the expense of the D-mark while the share of the yen had fallen, too.

The overall impression from these data is that, although there has been some change in recent years, the yen is still to a far lesser extent an international currency than the US dollar and the D-mark. In addition, Japan is far from taking the lead in a kind of Stackelberg leader-follower framework with the yen as a regional 'anchor' for other Asian currencies as sometimes suggested. With regard to the general criteria mentioned earlier, the country's inflation performance over the years has been impressive, but its financial markets in parts are still narrow and thin and subject to restrictions. The yen still derives its international importance from the weight of Japan's economy, and from the activities of Japanese residents, in the world rather than from its use by non-residents. So far, in many respects it is not a close substitute for other currencies. Thus, the prospects for a tripolar world system of more balanced financial relations and, hence, a greater stability of exchange rates remain weak.

10

CONCLUSION

The growth of the Japanese foreign exchange market has markedly contributed to the fundamental changes international financial relations have undergone in recent years. It was not enough to drive the world monetary system away from dollar hegemony to a true tripolar standard which, in a sense, would have been beneficial in making the economies of the big industrial countries less vulnerable to, and less dependent on, US developments. But, widely unnoticed, it was enough to add remarkably to the systems instability.

The preceding chapters have demonstrated that, in parts, compared to other centres of foreign exchange the risks in this market appear high. On the one hand, this refers to the yen's variability which appears not only higher than that of other currencies but also determined by other patterns and (ir-)regularities. On the other hand, there is an accumulation of risks resulting from a relatively large and growing share of OTC derivatives, market participants' seeming unawareness of the dangers of currency trading supported by official regulations and attitudes towards foreign exchange losses, a widespread lack of facilities for risk monitoring and risk management and an extraordinary high volume of transactions exposed to payment system risk which all add up to a very peculiar situation.

It has become obvious that, nowadays, financial centres worldwide are not so interconnected that differences between them could not continue to exist. But, they are sufficiently interrelated for failures in one market to influence all others. Recent official and private initiatives to cope with the problems look encouraging. Modified capital and accounting rules, market deregulation, netting arrangements and measures to strengthen risk monitoring and control will get Japan nearer to international standards. However, there is a danger that official negligence and ongoing attempts to shelter Japanese institutions from outside influences delay the implementation of reforms. Liberalisation of markets without the necessary discipline could prove fatal, not only for Japan, but for the financial community worldwide, and ridicule any efforts of international cooperation in this field. There is an urgent need to integrate Japan more tightly into the world financial system, not only its markets but in particular its practices of regulation and prudential control.

NOTES

1 MARKET HISTORY

1 Actually, there had already been earlier attempts at industrialisation by some *han* (feudal domain) governments but they were rather modest concentrating on agricultural and defence purposes. See, for example, Francks 1992: ch. 2.
2 See for the details Patrick 1967:245–9.
3 The following relies heavily on Bank of Japan 1991a.
4 Under the regime of Toyotomi Hideyoshi the Japanese returned to making their own coins. Under his rule the *oban,* one of the world's largest gold coins at 165 grams that covered the palm of an adult's hand, was minted in 1588. See for the details Bank of Japan 1991a: 8–9.
5 See for the activities of the *ryogae* in detail Tamaki 1995:4–16.
6 'After 1700, the official rate was fixed at 60 momme (225 grams) of silver for 1 *ryo* of gold, but this rate was not always observed' Bank of Japan 1991a: 12.
7 There are hints in some historical writings of the issuance of paper money in Japan as early as the fourteenth century, but, so far, this has not been verified. See Bank of Japan 1991a: 6, 12.
8 The Tokugawa *shoguns* regarded overseas trade as a potentially destabilising political influence due to its close connections with missionary activity and foreign political influence. See also Morris-Suzuki 1991:9. The Dutch were the only Europeans enjoying a privilege due to the fact that they were not Catholics and, in addition, had helped the Tokugawa to put down the Shimabara revolt 1637–38. See, for example, Hartmann 1996:19.
9 See Bank of Japan 1991a: 16–17, and for the early experiences of foreign officials and merchants with the currency system, as well as its abuses, in the 1860s, Notehelfer 1992:56–57.
10 Mexican silver dollars were also permitted to circulate in Japan. For this purpose, they were each stamped with an official seal indicating the value of 3 *bu* (¾ of one *ryo*). See Bank of Japan 1991a: 17.
11 Somewhat misleading, this paper money was called 'gold notes', issued by the Dajokan, the first Cabinet of the Meiji era. But, similar to the also inconvertible notes issued by the Mimbusho (the civil affairs ministry) later on, it did not manage to gain public confidence. See Bank of Japan 1991a: 18–19.
12 Matsukata Masayoshi was the first government advisor and in this role engaged in the Meiji administration's tax reform as well as in the delegation to the Paris exhibition in 1878. From 1881 onwards he was finance minister and in the 1890s twice prime minister. He was dedicated to the idea of establishing a central bank and, after investigating various European central banks, decided to set up the

Bank of Japan after the Belgian model. See Patrick 1967:252, Bank of Japan 1991a: 22–3 and the very detailed description in Tamaki 1995: Part III.

13 See for the following Patrick 1967:245–6.

14 Einzig 1971:261–2. See for an overview of the early history of the yen also Lothian 1991.

15 The decision followed a controversy between two influential men from the Ministry of Finance. Ito Hirobumi, who was strongly influenced by the experience of a monetary mission to the United States he led in the summer of 1871, found himself in opposition to Yoshida Kiyonari who had spent several years in New Hampshire and in London—where he witnessed the Bank of England's handling of a banking crisis—which enabled him to compare the banking systems in both countries. See also Tamaki 1995:28–30.

16 See Patrick 1967:267–72, Einzig 1943: Chapter XI.

17 US banks at that time were not much interested in international operations. Thus, the first branch of a US bank in Japan, the International Banking Corporation (IBC), opened only in October 1902. Citibank, which aquired IBC in 1915, had four Japanese branches in 1926: in Yokohama, Kobe, Tokyo and Osaka with operations in Japan being reported to be particularly lucrative. See for these and other details Brown 1994:11.

18 Initially, the government provided only one-third of the bank's capital, but, in the course of time, after severe losses and repeated bail-outs, it assumed complete control. See for the circumstances preceding the bank's establishment Patrick 1967:267.

19 See Patrick 1967:268. The Bank of Japan became responsible for the exchange business with the removal of the gold embargo in 1930. See Aono 1931:13–14.

20 The monetary damage of the earthquake of 1 September 1923 was estimated ¥5.5 billion. As a first reaction, the government imposed a 3-day moratorium on all payments resulting from contracts dating before the day of the catastrophe. Reconstruction was financed by special 'earthquake bills' amounting to ¥2.5 billion, which were bought by the Bank of Japan and by the country's 96 biggest banks. See also Born 1977:473–4.

21 The financial panic of March 1927 was triggered by the insolvency of several regional banks gathering momentum after the Bank of Taiwan, the Fifteenth Bank—headed by the oldest son of Matsukata Masayoshi—and the trading company Suzuki Shoten broke down as well. At the height of the crisis, the Bank of Japan's issuance of bank notes and loans increased by more than ¥1 billion a day. To cope with the run the Bank issued emergency notes of large denomination (200 yen) which were printed crudely on one side only. See for the details Bank of Japan 1991a: 25–6, Calder 1993:27–8.

22 Primarily due to the country's balance-of-payments deficit there was massive speculation that Japan could not stay on the gold standard. The following numbers show the severity of the crisis: for a year and a half Japanese and foreign private banks had continuously bet against the yen, with the Yokohama Specie Bank alone selling ¥740 million. The country's gold reserve sank from ¥1 billion in 1929 to ¥470 million in December 1931. See Calder 1993:299.

23 The only exemption was Hong Kong, where the Japanese issued yen. See for these and other details Einzig 1943: Chapter XII.

24 See, for example, Paben 1994:307, Calder 1993:39.

25 See Brown 1994:10. Among the foreign banks Citibank officials were the first who, exploiting close connections with the SCAP, tried as early as 1945 an inoffical return. Compare Brown 1994:14–16.

26 See for a general overview of financial regulation and reform after World War II among others Takeda and Turner 1992, Hamada and Horiuchi 1987, McCall

Rosenbluth 1989, Viner 1988 and the Japan Securities Research Institute various issues, as well as the contributions in the Japan Securities Research Institute 1992 and in Takagi 1993. The following relies heavily on Takeda and Turner 1992.

27 This, in principle, remained the basic law for the conduct of international transactions for the next thirty years until in 1980 it became fundamentally revised. See also Tateno 1993:453.

28 See, for example, Einzig 1971:263, Tateno 1993:453.

29 In this account, which will be described in detail later, the government held its foreign reserves. See also Ito 1992:82.

30 In March 1953, transactions involving the pound sterling became allowed as well. See Tateno 1993:454.

31 For example, in 1970, the annual volume of foreign exchange transacted in Tokyo was $11.8 billion, still only about 60 per cent of the volume of Japanese exports at that time. See Takeda and Turner 1992:15.

32 The first samurai bonds were issued by the Asian Development Bank in 1970 and the World Bank in 1971. See, for example, for this and the following, Hsu 1994:303–4.

33 The following relies heavily on Takeda and Turner 1992:12–21.

34 See for the recent history of liberalisation in the Japanese foreign exchange market Fukao 1990:142–4.

35 The first was the European Investment Bank in 1977. See for the details Hall 1993b: 104–8, Duser 1990:54–57.

36 See for the details Ito 1992:329, and for the importance of this committee for example Duser 1990:55, Frankel 1991:17.

37 See also Takeda and Turner 1992:17–18, Viner 1988:201.

38 The Bank of Japan exerts control over the Japanese interbank market via six money market brokers (tanshi gaisha) through which all transactions have to pass and which the Bank regards as subsidiaries. See Hamada and Horiuchi 1987:256, McKenzie 1993:439–40.

39 See, for example, Wood 1993:8, who gives a very lively account of the bubble and its concomitant dangers.

40 The effects of this concerted action were often judged highly overestimated, as many experts believe the agreement only helped bring down a currency that had already started to decline. See for this and for the following, for example, Wood 1993:18–20.

41 There is a Nikkei index for the cost of golf club membership in the Kanto area which doubled between 1982 and 1985 and even tripled in the two following years. Single membership rates went up to $2million for the most expensive club. See for example Reading 1993:207.

42 An empirical analysis of this development is given by Werner 1994.

43 The development is described in more detail by Reading 1993:110–13.

44 See for the details Reszat 1995 as well as for an overview of the economic implications Okina 1995a.

45 See for a detailed discussion of the Japanese 'credit crunch' and its various reasons Ono 1996, as well as for an explanatory approach Baba 1996.

46 See for the following Fuchita and Osaki 1994, Kawai 1995.

47 See, for example, the various contributions in Nomura Shoken 1994.

48 Two of those critics are Fuchita and Osaki 1994. They emphasise the need to distinguish between a decline in Japan's international role as a financial centre, which they would not consider as harmful *per se,* and a decreasing efficiency of Japanese markets for Japanese participants and Japanese products. The latter, so the argument goes, would increase the cost of capital thereby adversely affecting the competitiveness of Japan's industry.

2 MARKET PARTICIPANTS

1 These are the estimates of Olsen & Associates, an institute for financial forecasts in Zurich. See *Frankfurter Allgemeine Zeitung* 1995.
2 See for a general description of the Tokyo foreign exchange market, for example, Bank of Tokyo 1990, Kuroda 1995:222–34, Nakaishi 1991 and Tateno 1993.
3 Those rules always existed 'more in name than in substance' (Nakaishi 1991:248) and even the Bank of Japan was said to have broken them by intervening if need be. See, for example, Ogawa 1994.
4 Compare also Kuroda 1995:228, Nakaishi 1991:248, Tateno 1993:466–7.
5 A detailed description of the Bank of Tokyo's various activities can be found in the Internet. See Bank of Tokyo 1996.
6 For example, when in 1995 at the height of the bad-debt crisis in Japan the capital ratios of big Japanese banks ranged between 9 and 10 per cent the Bank of Tokyo managed to maintain 10.6 per cent. See in greater detail Reszat 1995.
7 For example, this was one of the reasons the US credit rating agency Moodys gave when the Bank lost its AAA rating in 1986. See Viner 1988:164.
8 Before April 1996 there were ten city banks (or eleven if, as normally done, the Bank of Tokyo is included as well): the Dai-Ichi Kangyo Bank, Sakura Bank, Fuji Bank, Sumitomo Bank, Sanwa Bank, Mitsubishi Bank, Tokai Bank, Daiwa Bank, Asahi Bank and Hokkaido Takushoku Bank. After the merger, the new Bank of TokyoMitsubishi Ltd (BoTM) became the largest city bank.
9 Viner mentions as an example the case of Fuji Bank which during those years established Fuji International Finance in London to keep pace in the euromarkets, Fuji Bank (Switzerland) to cover the Swiss capital markets and Fuji International Finance in Hong Kong for activities in the Pacific region. Viner 1988:155. Meanwhile, the list of Fuji Bank's activities worldwide has grown remarkably showing for Europe and the Middle East only in 1996 7 branches as well as 5 representative offices and 6 affiliate companies. For the Americas the numbers are 6 branches, 6 representative offices and 8 affiliate firms; in Asia and Australia there are 9 branches, 11 representative offices and 4 affiliate firms. See for a complete list Fuji Bank 1996.
10 However, the table also shows that Japanese banks are not the ones with the strongest global activities, the first among them, the Bank of Tokyo, ranking 18th worldwide. For comparison, the first bank in this league is Standard Chartered with $53bn total assets and 70.2 per cent business overseas, followed by CS Holdings ($298bn total assets and 66.4 per cent business overseas) and HSBC Holdings ($315bn total assets and 62.3 per cent business overseas). See *The Banker* 1996b.
11 Bailey *et al*. 1994:34, Viner 1988:149. A detailed description of the *keiretsu* and their various forms and activities can be found in Ito 1992: ch. 7, as well as Miyashita and Russell 1996.
12 Numbers, which exclusively refer to so-called 'horizontal' groups (i.e. firms in unrelated industries, in contrast to vertical ones consisting of firms on different stages of the production process), are from Dodwell Consultants, cited in Eli 1994:267.
13 According to Calder, the main banks on average supplied between 15 and 20 per cent of total funding for each *keiretsu* member during the high-growth period with a declining role in more recent years. See Calder 1993:142–3.
14 Main banks serve as organisers for company loan consortiums, they have crucial monitoring and advisory functions and often send their representatives to the companies' boards of directors. In case of financial difficulties, they are responsible for arranging rescue packages and planning and orchestrating lifeboat actions. See in more detail Aoki 1988:148–9.
15 See for the following in particular Viner 1988:149.

16 Those are the Industrial Bank of Japan (IBJ, Nippon Kogyo Ginko), Long-term Credit Bank of Japan (LTCB, Nippon Choki Shinyo Ginko) and Nippon Credit Bank (Nippon Saiken Shinyo Ginko, formerly Nippon Fudosan Bank). See for a detailed survey of these and other financial institutions in Japan, for example, Tatewaki 1991.

17 Like the trust banks and the Norinchukin the long-term credit banks were allowed to set up securities subsidiaries in April 1993. Nevertheless, many restrictions remain. See for the details Friedland 1993 and for a discussion of the long-term credit banks' changing role in general Watanabe and Nakatani (1991).

18 In the 1930s IBJ underwrote about 80 per cent of corporate bonds in Japan. Compared to the long-term credit banks securities houses like Nomura played a minor role in those days. See for this and the following *The Economist* 1987f, Wohlmannstetter 1991:54–60.

19 A detailed analysis of IBJ's role in Japan's economic growth process and the influence it exerts on various levels is found in Calder 1993:158–73.

20 The seven Japanese trust banks are Mitsubishi Trust & Banking, Sumitomo Trust & Banking, Mitsui Trust & Banking, Yasuda Trust & Banking, Toyo Trust & Banking, Chuo Trust & Banking and Nippon Trust & Banking.

21 In 1985, nine foreign banks were allowed to set up separate trust banking entities. They were: Morgan Trust & Banking, Nippon Bankers Trust, Chase Manhattan Trust & Banking, Cititrust, Manufacturers Hanover Trust, Chemical Trust & Banking, Union Bank of Switzerland Trust & Banking, Crédit Suisse Trust & Banking and Barclays Trust & Banking. However, compared to the Japanese trust banks those foreign institutions have only a minor role. See for the details of trust banking in Japan, for example, Viner 1988:171–4, Wohlmannstetter 1991:60–7.

22 In 1954, the Ministry of Finance ordered commercial banks and securities houses with trust business to establish separate trust banking entities. See also Fujii, J. 1991.

23 The numbers are of end of March 1994. See Federation of Bankers Associations of Japan 1994.

24 A critical account of the structures and links in agricultural finance in Japan is given in Reading 1993:153–4 and 215–16.

25 The numbers are of September 1985. See Viner 1988:262.

26 See, for example, the figures in Tateno 1993:462–3, Table 14.2.

27 See for the situation of foreign banks in Japan in general Wegmann 1994.

28 In 1980, the monopoly of the foreign banks was broken by the Ministry of Finance giving permission for domestic banks to raise funds abroad and bring them to Japan (up to a limited amount). See, for example, Horne 1985:169.

29 The biggest is The Tokyo Forex Co. Ltd. See Ogawa 1994. The others are Hattori Marshall Co. Ltd, Nittan AP Co. Ltd, Yamane Tanshi Co. Ltd, Ueda Harlow Ltd, Kobayashi & Co. Ltd, Yagi Euro Corporation and Meitan Tradition Co. Ltd.

30 Those are Tokyo Tanshi, Ueda Tanshi, Yamane Tanshi, Nippon Discount and Call Money, Yagi Tanshi and Nagoya Tanshi. Viner 1988:188. The money market brokers or *tanshi gaisha* and the foreign exchange brokers *(gaikoku kawase buroka)* together are sometimes generally called simply brokers *(tanshi gyosha)*. See Kuroda 1995:403.

31 A typical money market transaction goes as follows: the lender bank transfers a deposit to a money market broker receiving from him a promissory note. The borrower bank, in turn, gives a promissory note to the broker receiving in reaction the lender's deposit. Settlement takes place on the banks' accounts kept with the Bank of Japan with the latter functioning as a clearing house in this market. For the conduct of the transaction the broker gets a commission

which is 0.125 per cent of the amount on average. See for the details Baum and Hayakawa 1994:561.

32 For example, in 1995, Kobayashi shifted its dollar/D-mark trading operations to Singapore, and, the same year, Nittan AP announced its complete withdrawal from dollar/Swiss franc spot transactions due to heavy losses as well as its move of operations in foreign currency options from Tokyo to Singapore. See, for example, Inoue 1995, Terazono 1996.

33 Electronic brokers name credit risk as the main hurdle for trade forwards. *See Asiamoney* 1996:107.

34 See for the following, above all, the detailed survey of Gawith 1994.

35 See for a detailed discussion Nakao 1995:61–78.

36 In particular, Nomura has become famous for its strategy to sell securities door-todoor. See the lively description in Alletzhauser 1990 of how Nomura 'mobilized its troops' in Japan in reaction to the Wall Street crash in October 1987, when 2,500 salesmen, 2,900 door-to-door saleswomen and another 2,000 customer-service ladies all started urging their clients to buy. See Alletzhauser 1990:19–20.

37 See for the details, for example, Evans 1996, *The Economist* 1996b.

38 This may help explain why, for the investment banks, the opportunity to move into foreign exchange is considered as the biggest advantage of the Financial System Reform Act of April 1993. For example, Nomura is reported to have 50 per cent of its foreign exchange needs handled by the subsidiary. In addition, in the longer run the subsidiary is expected to offer a wide range of products, including derivatives, thereby adding to the group's profitability. See Timewell 1994:55.

39 Those are the Mitsubishi Corporation, Mitsui & Co., Itochu (the former C. Itoh & Co.), Marubeni Corporation, Sumitomo Corporation, Nissho Iwai Corporation, Toyo Menka Kaisha, Kanematsu Gosho and Nichimen Corporation. See, for example, Eli 1994:272.

40 To this purpose, they set up finance companies overseas, particularly in London. See for these and other activities in detail Viner 1988:223–7.

41 Those are Nippon Life Insurance, Dai-Ichi Mutual Life Insurance, Sumitomo Life Insurance, Meiji Mutual Life Insurance, Asahi Mutual Life Insurance, Mitsui Mutual Life Insurance, Yasuda Mutual Life Insurance and Chiyoda Mutual Life Insurance.

42 See for the life insurers' development, for example, *The Economist* 1987b, and for the performance in recent years Baker 1996c. A general overview of the insurance industry can be found in Kuroda 1995:375–86.

43 For example, at the end of March 1991 the yen/dollar rate, at which the life insurers closed their books, stood at ¥140.95. One year later it was about 10 per cent less. With overseas assets making up for about 15 per cent of total industry's assets at that time, the life insurers had to cope with around ¥2 trillion in currency losses. Estimates of hedge ratios for those overseas assets range between 10 and 20 per cent. See Shale 1992:49. A detailed overview of the situation more recently gives Smithers 1994.

44 Those are Tokio Marine & Fire Insurance Co., Yasuda Fire & Marine Insurance Co., Mitsui Marine & Fire Insurance Co. and Sumitomo Marine & Fire Insurance Co. which together hold a market share of about 50 per cent. See Wohlmannstetter 1991:95.

45 Now the market is open to 150 licensed investment-advisory firms, 40 of which are foreign-owned. See Wegmann 1994:174.

46 Viner calls Japan one of the most rapidly greying societies in history. See Viner 1988:213.

47 See for a detailed overview of the Japanese pension system Igarashi 1991.

48 Ikeya 1995a. In January 1996, the latter number had risen to ¥23 trillion. See Suzuki 1996a.
49 See, for example, Viner 1988:214–16, Reading 1992:156, Suzuki 1996a.
50 Since 1995, investment advisory companies are allowed to manage public pensions. In January 1996, Nempuku decided to let advisory firms manage a part of its funds. Among the three firms chosen were two foreign-affiliated ones, Goldman Sachs Asset Management Japan Ltd and Morgan Stanley Asset & Investment Trust Management Co. At the same time, private pension funds announced that they were withdrawing funds from the life insurance companies as a reaction to a lowering of guaranteed yields. See, for example, Suzuki 1996b.
51 See for the details Hsu 1994:186–8, Tanabe 1992.
52 Viner 1988:32, Wohlmannstetter 1991:84.
53 Not only in foreign exchange markets, and not only in Japan, observers sometimes conclude that analysts tend to blame hedge funds as culprits when market relations become blurred and other explanations are not at hand. See, for example, Bennett and Shirreff 1994:26.

3 MARKET SEGMENTS AND TRANSACTIONS

1 The results for the Tokyo foreign exchange market were published in detail in Bank of Japan 1996a.
2 See for a general shift in competitiveness between financial centres in Asia in this context for example Reszat 1996.
3 A more recent classification which is also followed in the latest BIS survey distinguishes between traditional foreign exchange market segments and derivatives markets with both including outright forwards and foreign exchange swaps. In contrast, this study looks at the traditional segments and at the futures and options markets separately.
4 For internationally traded currencies interest rate arbitrage normally secures that the swap rate always equals the interest rate differential between two currencies. Any deviations would instantaneously trigger capital movements eliminating the difference. For example, if the interest rate differential were higher than the swap rate market participants in search of risk free profits would have an incentive to raise funds in the market with the lower interest rate, swap them into the other currency, invest the amount for a certain period at the higher rate and reverse the transaction at the end of the period. The conditions of the reversal would be fixed at the beginning by the forward leg of the swap. The cost of this transaction would be the swap yield which is determined by the difference between spot and forward rate. Another possibility would be to raise funds at the higher interest rate, swap them into the lower-interest currency and invest them there, since it is the buyer of the low-interest currency that gets the swap yield paid. However, since this relationship is known to all market participants—the forward rate is quoted as premium or discount to the spot rate for this reason—those kinds of deviations are extremely rare.
5 Traditionally, the principal source of data on OTC derivatives markets is a survey carried out every six months by the International Swaps and Derivatives Association (ISDA), an industry-backed organisation set up in New York in 1984 to standardise derivatives documentation. However, reporting by members is voluntary and the population covered varies. The survey provides information on turnovers every six months and amounts outstanding at year-ends. See also Bank of England 1995:190.
6 A detailed introduction to financial futures in general can be found in Dubofsky 1992: Chapter 11.

7 Dubofsky 1992:4. The first one was a rice exchange that developed in the front yard of the house of a war merchant for Hideyoshi, Yodoya Keian, in Osaka. It was institutionalised with the establishment of the Dojima Rice Exchange which until 1710 dealt in actual rice and afterwards began to issue and accept rice warehouse receipts, so-called rice coupons, as well. Those coupons, which were actively traded, became the world's first futures contracts. See for the details Nison 1991:14–15, and for the long history of futures trading in Japan in general also Schaede 1990.
8 Currency swaps, in contrast to foreign exchange swaps, are a combination of interest rate and currency instruments in that they consist of an exchange of streams of interest payments in different currencies for an agreed period of time and of principal amounts in different currencies at a pre-agreed exchange rate at maturity. See also Bank for International Settlements 1996a: 41.
9 See in more detail *The Nikkei Weekly* 1995a.
10 A detailed survey of DPCs and their activities is given in Remolona *et al.* 1996.

4 ATTITUDES TOWARDS RISKS

1 See for the basic concepts in detail Rodriguez and Carter 1979:228–49 and Walmsley 1983:367–9.
2 Another possibility is to close the position by a money market transaction, that is by borrowing the amount in dollars, changing it instantaneously into home currency and investing it for the respective period with the loan paid back with the dollars received from the export sales. In this case, there is no currency risk because the transition from one currency to another takes place at once. The cost is the difference in interest rates between the two currencies. Since normally the swap rate equals the interest rate differential both methods should be equivalent in principle. However, there may be credit lines involved or other individual reasons why one of them may be preferred.
3 An overview of how Japanese firms coped with the rising yen is given in Klitgaard 1996.
4 In cases where the balance sheet items are translated into specific cash flows in the future which are to be protected against exchange rate changes the distinction between hedging and covering becomes blurred. Rodriguez and Carter hint at the fact that often both terms are used interchangeably. See Rodriguez and Carter 1979:670.
5 See for the details also Ikeya and Toyofuku 1993, *The Economist* 1994.
6 However, even before the Ministry's decision city banks had already been reported as no longer accepting roll-over requests. On the other hand, for an unspecified limited transition period, exemptions from the official ban were said to be still granted.
7 A detailed discussion of the case can be found in Edwards and Canter 1995.
8 See for the following *The Economist* 1987a, Koo 1995:17–18.
9 Compare also for the variety of influences Koo 1995:17–23.
10 A more detailed description of the following can be found in Reszat 1991:28–50.
11 In German, this strategy is somewhat misleadingly also called Terminkursarbitrage (forward rate arbitrage). See Fischer-Erlach 1995:199, and for a more detailed description Rodriguez and Carter 1979:140–1, Reszat 1991:45–8.
12 See for the case that expectations do not come true and overall losses occur Reszat 1991:47–8.
13 Compare also Allen and Taylor 1990:49, and for a detailed description of trading theories in the foreign exchange markets in general Walmsley 1983: Chapter 7.

14 See for an overview of traditional theories of exchange rate determination for example Krueger 1984 and Copeland 1989.
15 This assumption is in a sense paradoxical: if market rates fully and instantly reflect all available information, then market participants have no incentive to gather costly information which then cannot be reflected in the price either. See for this paradox and its solution Allen and Taylor 1990:49. Early approaches to formalise the behaviour of chartists in models of exchange rate determination are De Grauwe and Vansanten 1990 and Frankel and Froot 1991. See for analyses which test the profitability of technical trading-rules for example Curcio and Goodhart 1991, 1992 as well as Levich and Lee 1993 and the literature cited there.
16 See, for example, for those rules in detail Walmsley 1983:193–4, Schwager 1984:427–9.
17 In what follows both terms are widely used synonymously although, exactly taken, they have a different meaning with charts referring only to the graphs while technical analyses include a variety of tools.
18 See for a detailed description of bar charts and their application Schwager 1984:333–71.
19 The examples in the figure are based on the following numbers:

Period	Open	High	Low	Close
1	20	30	15	25
2	25	25	10	15
3	30	35	15	20
4	45	50	35	40
5	25	40	25	35

See also Nison 1991: 23.

20 A survey of this technique and its history is given in Nison 1991 and Shimizu 1986.
21 See for the Japanese names Bank of Tokyo 1990:140.
22 According to Kenkyusha's New Japanese-English Dictionary tasuki is a cord or sash for holding up tucked sleeves.
23 A glossary of terms can be found in Nison 1991:289–301.
24 These results are in a sense also confirmed by a survey of the empirical literature on exchange rate expectations which comes to the conclusion that short-run expectations tend to move away from some long-run values considered to be 'normal' while long-run expectations show a tendency back to them. See Takagi 1991a.
25 Compare the Chronology of Accounting in Japan in Cooke and Kikuya 1992: Appendix I. See for the principles and practices of Japanese accounting in general also Cooke and Kikuya 1992: Part II, Ballon and Tomita 1988. An international comparison of accounting rules can be found for example in Born 1994, Kuting and Weber 1994, Mueller *et al.* 1994, and Urano 1994.
26 Keio Gijuku, established in 1885, was the first institution in Japan to teach Western economics before the Meiji Restoration. See, for example, Morris-Suzuki 1991:47–8.
27 Baker and Terazono 1994. See in detail for example Kuting and Weber 1994:212–41.
28 See for the first argument, for example, Viner 1988:98, and for the second Suto 1996:27. The latter names two principles, historic costs and realised gains, as the main pillars of the present accounting system in Japan in which the main 'players' in the financial markets of the second half of the 1980s have become caught.
29 See Shimizu 1994. The following relies strongly on Kuroda *et al.* 1994.

30 See for the details Cooke and Kikuya 1992:97–9.
31 A detailed description of the JICPA, its organisational structure and the main roles of its diverse committees is given in Cooke and Kikuya 1992:108–11.
32 Since the Commercial Code in Japan was established in 1899 under the auspices of the Ministry of Justice, that Ministry had been most influential in setting disclosure standards. After World War II, it lost much of its importance to the Ministry of Finance and the Tax Bureau. Cooke and Kikuya distinguish the following ranking of regulatory influence prevailing now which depends on a company's size:

1 for small companies: Tax Bureau, Ministry of Justice, Ministry of Finance;
2 for medium companies: Ministry of Justice, Tax Bureau, Ministry of Finance;
3 for large companies: Ministry of Finance, Ministry of Justice, Tax Bureau.
See Cooke and Kikuya 1992:102.

33 The Keidanren (Keizai Dantai Rengokai) or Federation of Economic Organizations is the largest and most influential business organisation in Japan. Founded in 1946, it consisted of 122 industrial associations and 939 companies at the end of 1991 including automobile manufacturers, shipbuilders, iron and steel and petrol companies, the chemical industry and trading companies. The Nikkeiren (Nihon Keieisha Dantai Renmei) is the Japan Federation of Employers' Associations. The Keizai Doyukai, the Japan Committee for Economic Development, serves as a forum for business executives to express their personal views with far-reaching implications for policy and administration. The Japan Chamber of Commerce and Industry (Nippon Shoko Kaigisho or Nissho) is the central body of the regional chambers of commerce and industry protecting the interests of small businesses.
34 For example, it is common practice for a company to sell a listed security which is subject to disclosure at market price or the lower of cost or market at a higher than the market price (such as the book value) and, at the same time, buy an unlisted security at a price above the current price. This way, it can keep unlisted securities which have suffered substantial valuation losses on the books without disclosing the deterioration. See also Kuroda *et al*. 1994:43–4.
35 There are other, traditional off-balance-sheet items such as guarantees or credit lines, which are normally not considered.
36 It should be noted that this standard was originally introduced to rule banks' conversion of foreign currency and not for market valuation. See Ogawa and Kubota 1995:72. A detailed description of the practice of foreign exchange accounting of Japanese banks and recent changes by the New Standard is given in Koyama 1993. The differences in financial accounting and disclosure standards for banks and nonbanks as well as the various instruments in general are described in Yamada 1996.
37 A detailed comparison is given in Bank of Japan 1993b: 45. Although the JICPA was a founder member of the International Accounting Standards Committee (IASC) in 1973 and participates in preparing international standards Japanese practices often differ from the IAS. See for the details for example Cooke and Kikuya 1992:132–6.
38 See for the details of valuing currency options, for example, Dubofsky 1992:646–51.
39 See, for example, *The Economist* 1996a, and in particular for Japan, Kuroda *et al*. 1994:56.
40 For example, this had happened in 1985. See Toyofuku 1993.

INTRODUCTION TO PART III: THE RISKS

1 The stocks at the end of 1995 reached $4.7 trillion. See Bank for International Settlements 1996b: 141.

2 Issing and Bischofberger consider the latter as so-called product-immanent risks. See Issing and Bischofberger 1996:115.

5 MARKET RISKS

1 A detailed discussion of the law of one price and the conditions under which it holds nationally and internationally, providing many examples to illustrate different cases, is given in Copeland 1989, Chapter 2.
2 For example, one widely used argument in this context is about quality differences. See Sazanami *et al.* 1995:4.
3 Compare also Ito 1992:305–8. Yoshikawa 1990, stressing the importance of supply factors, has studied the role of relative nominal wages, the relative price of natural resources and relative productivity in Japan's export industry. He found that the latter was the most important factor to explain the yen/dollar rate in the long run during the 1970s and 1980s.
4 See Kimura *et al.* 1995 and the literature cited there. An early elaboration of pass-through effects and their implications for the balance of payments is given in Magee 1973.
5 See for the difference between pass-through and the law of one price, for example, Menon 1995:555–6.
6 This holds particularly for European currencies versus the D-mark and for the D-mark/dollar relation. See Jorion and Sweeney 1996. The authors' results are derived with help of multivariate tests for unit roots which do not explicitly search for explanations of this phenomenon.
7 This is shown in great detail in Kimura *et al.* 1995 in an analysis including export/import pass-through rates as well as pricing-to-market ratios measuring a relative diversion between export and domestic prices in response to exchange rate changes and import-price-penetration ratios showing a respective divergence of import and domestic prices. An abridged version of this study has been published as Kimura *et al.* 1996.
8 See also De Grauwe, Dewachter and Embrechts 1993:57. An overview of respective theories provides, for example, Krueger 1984, Copeland 1989 and Taylor 1995. A survey of the two broad strands of theories based on the asset market view in particular give MacDonald and Taylor 1992.
9 There are several forms from weak to strong rationality differing by the type of information included. A lucid exposition of the various concepts and their implications is given in, for example, Begg 1982, Bray 1985.
10 However, this view has been doubted recently considering the volatility of some underlying monetary variables. See Bartolini and Bodnar 1996.
11 A survey of those surveys is given in Takagi 1991a.
12 The classical contribution hinting at the poor out-of-sample forecasting performance of the structural exchange rate models of the 1970s is Meese and Rogoff 1983. Compare for a general critique, for example, De Grauwe and Dewachter 1992:26 and the literature cited there.
13 See for these and other motives as well as the various concepts of expected utility Schoemaker 1982.
14 This would mean that the Central Limit Theorem would hold which states that a sample of independent identically distributed (i.i.d.) random numbers with finite variance which approaches infinity has a probability density function which approaches the normal distribution.
15 See, for example, Goodhart 1995. He argues that it is quite normal, in particular

for younger people, to emphasise the more recent events and to perceive earlier episodes as less dramatic.

16 An effective exchange rate is a trade-weighted rate which is calculated to get information of a currency's overall movement taking into account the effect that it may depreciate against some currencies and appreciate against others at the same time. See, for example, Walmsley 1983:297.

17 See Funke and Goldstein 1996:216, as well as for the method JP Morgan 1995:77–80.

18 See for an overview of early high-frequency data analyses with respect to the foreign exchange market Flood 1994:131–3 and the literature cited there.

19 See for the following in detail Mandelbrot 1969:83–6. An early study of these properties for stock market prices, for example, is provided in Fama 1965.

20 However, as Granger emphasised, spectral methods do not require the specification of a model but follow directly from the assumption of stationarity. Compare Granger 1966:151.

21 There are many economic variables which after removal of a trend in mean and seasonal components have similarly shaped power spectra. See Granger 1966.

22 This refers to the length of the series, i.e. the number of observations, and not as sometimes misleadingly assumed, to the time span covered by the sample. The misunderstanding helps explain why, for example, in certain studies normality has proved to hold for monthly or quarterly data, that is for short series with comparably few observations, but not for the respective longer series of weekly or daily data. See, for example, Kaehler 1991 as well as Boothe and Glassman 1987 who also summarise the results of respective earlier studies.

23 Mandelbrot is calling these processes 'nearly Gaussian'. See Mandelbrot 1969:86.

24 Somewhat misleading Mandelbrot calls this phenomenon also the infinite variance syndrome hinting at the fact that with increasing sample length the variance does not converge towards a finite value. See Mandelbrot 1963:369, 1969:84.

25 Those jumps are extremely unlikely under the assumption of a normal distribution. For example, when on Monday, 23 September 1985, the day after the Plaza Agreement, the US dollar fell against the D-mark by 5.75 per cent, under the normal distribution a change of this magnitude would be expected to occur only once in about 70,000 years. See Kaehler 1991:2.

26 ARMA stands for Autoregressive Moving Average which means stochastic processes where one of the explanatory variables is the lagged value of the dependent variable and at the same time the error term of the equation is a linear combination of past and present white noise error terms. See, for a detailed explanation, for example, Gujarati 1995:736–7. Technically, with the presence of the Joseph effect the noise becomes ARMA (0, 8). See for this and the following Mirowski 1989a: 92.

27 The exact definition names three conditions: a sensitive dependence on initial conditions, topologic transitivity and density of periodic points. See Devaney 1989:50, and for an explanation of these conditions in detail also Frank and Stengos 1988.

28 In recent years there has been a big debate in economics about the validity of general macroeconomic models in their strong analogy to the physics concepts of the late nineteenth century. See for the general critique Mirowski 1989b and for an overview of this topic Arakawa 1996a, b.

29 In the literature there is some disagreement about the role dissipation plays in chaotic systems. Compare, for example, the definitions of chaos given in Grebogi *et al.* 1987 and Gutzwiller 1990.

30 In discrete time, the system may well appear to hit the same point several times which is explained by the fact that in this case, compared to a continuous-time analysis, its structure is only roughly presented.

31 See in more detail Reszat 1992a, 1993.
32 The fixed point attractor of a dissipative system should not be confused with a conservative system's point equilibrium. In the former, to use the physics metaphor again, any loss of 'energy' which is going on is compensated by an equal 'energy import' from the world outside to guarantee stationarity. This is wholly distinct from a conservative system's steady state where any influence from outside would have to be regarded as disturbance and nothing is 'attracted' or winds down. See for this point in more detail Mirowski 1990:301–2, Grebogi *et al.* 1987:238.
33 There is no universally accepted definition of a strange attractor. See for the different concepts Medio 1992:46. Many authors emphasise a strange attractor's fractal geometry which is characterised by self-similarity, i.e. by showing the same structure on all scales.
34 This condition does not hold for difference equations since they generate only discrete points. See Schuster 1989:107.
35 Thus a phase-space plot of a strange attractor would require at least three dimensions for a set of differential equations and two for maps representing discrete points in time. Compare, for example, De Grauwe *et al.* 1993:43.
36 Hsieh 1989:340. See for an early overview also Takagi 1989:59–74.
37 See, for example, Peters 1994:54–63 and for a most lucid description of the method Bovill 1996.
38 In particular, Harold Edwin Hurst was studying the flood patterns of the Nile in the first half or our century. He developed the R/S analysis as a new statistical method to cope with fluctuating levels of water reservoir. Mandelbrot rediscovered his work and put it in a more general framwork. See De Grauwe *et al.* 1993:207, Peters 1991:62.
39 Compare also De Grauwe *et al.* 1993:46–53, Peters 1991:146–9 and for the mathematical details of the general concept Lorenz 1989:186–91.
40 See the results of Dechert and Gencay and other works regarding monthly or daily data cited in Lux 1994: Table 1, as well as those of Tata and Vassilicos 1991 who study high frequency tick-by-tick data for the dollar/D-mark rate.
41 Compare also the reservations expressed in Peters 1991:158–60.
42 See for the details Peters 1991:152–5, and for the method and application in detail De Grauwe *et al.* 1993:166–206.
43 See for example the results for daily data presented in De Grauwe *et al.* 1993:217, Table 7.1. Studying high frequency data of the dollar/D-mark rate and the dollar/Swiss franc rate Tata 1991, Vassilicos 1990 and Tata and Vassilicos 1991 found no signs of low dimensional chaos.
44 See also Lux 1994: Table 2, which gives an overview of the results of different studies.
45 This is a widely used test developed by W.A.Brock, W.D.Dechert and J.A. Scheinkman. See for a short description De Grauwe *et al.* 1993:245–6.
46 Ruelle 1990:244–5, see for the following also Lux 1994:10–11.
47 An overview of studies of empirical estimates for Lyapunov exponents and correlation dimensions, not only for currencies but other financial markets as well, gives Lux 1994.
48 See for an overview Olsen Associates 1995 and for the details of the research program the working papers published by the group in the Internet under http://www.olsen.ch.
49 See for the details Pictet *et al.* 1996.
50 This dual character is due to the fact that, for a constant variance, any shift of probability mass from the shoulders to the centre of the distribution must be accompanied by a simultaneous shift of mass in to the tails, and vice versa. See Kaehler 1993:2.

51 The peculiarities of the statistical properties of the Japanese yen are regularly mentioned in respective studies. See for the skewness, for example, Boothe and Glassman 1987:303–4.
52 See for this classification, for example, Kaehler 1993:4–6, JP Morgan 1995:47.
53 See for the details for example Kaehler 1993, Takagi 1989:64–7.
54 The Markov property refers to a short-time dependence of observations in economic time series in contrast to a long-term persistence.
55 The original work first comparing the Stable and Student distributions for stock prices is Blattberg and Gonedes 1974 who found that the latter has a greater descriptive validity for those prices.
56 Compare the results of Kaehler 1993. See for a detailed description of ARCH models Mills 1992: Chapter 15, Bera and Higgins 1993.

6 DERIVATIVES

1 See for this and the following, for example, Walmsley 1996:204–7, 213–16.
2 Compare also the very lucid example which had been calculated for call options on the German DAX index in Goebel 1995:65–7.
3 See for a detailed discussion, for example, Goebel 1995:67–70.
4 See for the following Bank for International Settlements 1996b: 99–101.
5 See for this view, for example, Iskandar 1996.
6 What is done in principle is to approximate the change in the value (V) of an options portfolio in reaction to a given change in the price (u) of the underlying asset by a second-order Taylor series expansion of the following form

$$\Delta V=(\delta V/\delta u)\Delta u+\tfrac{1}{2}(\delta^2 V/\delta u^2)\Delta u^2$$

with ΔV and Δu being the changes in the value of the portfolio and the price of the underlying and the partial derivatives $\delta V/\delta u$ and $\delta^2 V/\delta u^2$ the delta and gamma values of the portfolio. To account for the volatility of the price of the underlying asset, Δu is replaced by a volatility measure which is a multiple m of the standard deviation σ of the price change determining the confidence level. Then the equation becomes

$$\Delta V=(\delta V/\delta u)m\sigma+\tfrac{1}{2}(\delta^2 V/\delta u^2)(m\sigma)^2$$

See for the basic framework Estrella *et al.* 1994, Appendix I: 41–3.
7 See for the difference between both methods also JP Morgan 1995:14.
8 There are two different methods to account for gamma risk, the Taylor series rule which accounts for a positive or negative gamma, and the gamma rule which supplements the delta-equivalent rule with an adjustment for negative gamma. See for the differences in detail Estrella *et al.* 1994, Appendix I: 41.
9 Additional consideration of volatility risk can either take the form of

$$V(\sigma+\Delta\sigma)-V(\sigma)$$

with the options revalued at different volatilities, or of a linear approximation of the form $(\delta V/\delta\sigma)\Delta\sigma$, where the options' volatility, the vega, is weighted by the change in volatility. See Estrella *et al.* 1994, Appendix I: 42.
10 The following relies heavily on Nagahata 1994:4–5.
11 The same holds for financial institutions in other countries as well. International business activities in general are often not directly backed by firms' computer systems. See Goebel 1995:76.
12 See for the following Nikkei Online 1996d as well as Inoue 1996.

13 One example which is discussed in detail in Inoue 1996 is the Sumitomo Corporation.
14 There were several Japanese members participating in the Group of Thirty Derivatives Project, namely Toyoo Gyohten, then chairman of the Bank of Tokyo, and Yoh Kurosawa, president of Industrial Bank of Japan, in the Group's Steering Committee as well as Tsuyoshi Hase from the Industrial Bank of Japan and Akira Watanabe, general manager of Mitsubishi Bank, in the Working Group. See for the report Global Derivatives Study Group 1993.
15 See for the following JP Morgan 1995:19.
16 See for the mathematical details of the structured Monte Carlo method JP Morgan 1995:98–106.
17 Scenarios have the additional advantage that they allow the calculation of confidence intervals without assuming that price and rate changes are normally distributed by simply computing the loss which is not exceeded in 95 or 99 per cent of occasions. Compare Jackson 1995:180.
18 See for possible alternatives, for example, Walmsley l996:238.
19 The foundations of this theory were developed by Harry Markowitz who made several assumptions about investors' behaviour and the way in which they come to their decisions. See for those assumptions as well as for the basics of modern portfolio theory in detail Allen 1983: Chapter 4.
20 See for the details *The Economist* 1995:95–6.
21 Sumitomo itself is not an LME member. Most of the dealer's transactions were carried out through intermediaries known as introducing metal brokers who have access to ring-dealing LME members. See for the details, for example, Spink 1996:45.
22 See for the details, for example, *The Financial Times* 1996b, c, d as well as Harris and Thomson 1996 and Mark 1996.
23 See also Denton 1996. Calculations by a JP Morgan trader suggest that the price volatility in the copper market he observed on one day at that time theoretically would be repeated once every 4.7 million trading days, or every 19,000 years. However, the trader observed the volatility to be equally severe for two successive days which according to his model has a probability of being repeated every 70.5 billion years. See *The Financial Times* 1996a.
24 A detailed description of the case can be found in Fay 1996, Rawnsley 1996.
25 See for the motives behind this decision, *The Financial Times* 1995 as well as Rawnsley 1996:22–3. Eventually, when the Japanese positions of Barings were unwound in two rounds, on 1 March and 10 March 1995, by Daiwa Securities which was appointed to unwind the positions in Osaka, and Nikko Securities which was responsible for the much smaller positions at the Tokyo Stock Exchange, there were side effects on the Nikkei index as foreseen. Compare, for example, Baker and Terazono 1995.
26 See for these and other activities of Japanese trading companies in Asia, for example, Dawkins 1996.
27 See for a detailed discussion, for example, Caplen 1996:58.
28 See for the feasibility and pros and cons in both cases Parsley 1996:79.
29 See as an example for such a scenario the most fascinating mixture of facts and fiction by a former geologist, Hadfield 1992, and for the economic and financial consequences in particular his Chapter 8 with the title 'Japan Falls and the World Follows'.

7 PAYMENT SYSTEM RISKS

1 See for this and other cases mentioned in the following Committee on Payment and Settlement Systems of the Central Banks of the G10 Countries (1996).
2 ECU-Clearing which was launched in October 1986 is operated by the Bank for International Settlements in cooperation with SWIFT. So far, the bulk of transactions in this system result from the attractiveness of arbitrage trading of ECU against the D-mark and, to a smaller extent, against the US dollar. See FischerErlach 1995:186–7.
3 The following relies heavily on Borio and Van den Bergh 1993:23–31.
4 See for the details, for example, Borio and Van den Bergh 1993:57.
5 See also Borio and Van den Bergh 1993:55, Committee on Payment and Settlement Systems of the Central Banks of the G10 Countries (1996), Chapter 3.
6 See for the early developments of those systems also Walmsley 1983: Chapter 20.
7 It is slightly misleading to refer to caps as 'credit limits' as is done in CHIPS since there is no necessary correlation between participants' net balance position and their credit exposure. See Borio and Van den Bergh 1993:37.
8 The process is somewhat different from that of the Fedwire system. See for the details Bank of England 1994:166–7.
9 The other is Eiliger Zahlungsverkehr (EIL-ZV, or CB Express System), which is a RTGS system. See for the details of both systems Deutsche Bundesbank 1994.
10 The third one, the Bill and Check Clearing System (BCCS) is not computerised so far. See for the following Bank of Japan 1992, Kuroda 1995:91–102.
11 In Japanese both versions are referred to as Gaikoku Kawase En Kessai Seido.
12 See for the history of the FEYCS and its functioning in detail Sakata 1994.
13 See for a detailed description of the BOJ-NET Bank of Japan 1991b.
14 Compare Borio and Van den Bergh 1993:16–17, Table 3, Bank of Japan 1991b: 6.
15 For Germany the respective figure was 70, for Canada 30, for Italy 20 and for France only 10. Compare Borio and Van den Bergh 1993:5–7.
16 See, for example, Committee on Payment and Settlement Systems of the Central Banks of the G10 Countries (1996).
17 This example is taken from Walmsley 1996:246.
18 See for the advantages of both forms of netting also Bartko 1991.
19 The FXNET Consortium consists of American Express, ABN-AMRO Bank, Bankers Trust, Bank of America, Bank of Scotland, Citibank, Credit Suisse, Lloyds Bank, Morgan Guaranty Trust Company, Swiss Bank Corporation and Union Bank of Switzerland. See for the following also Shirreff 1996:67.
20 In 1993, the annual number was more than 475 million messages worldwide and over 20 million for Japan. See for the figures Walmsley 1983:395, Nagahata 1994:40–1.
21 A short overview of the discussion can be found in Blanden 1996.
22 Compare Nikkei Online 1996b. See for a first discussion of plans to introduce general real-time-gross-settlement for Japan also Nihon Ginko 1997.

INTRODUCTION TO PART IV: POLICY ISSUES

1 The countries are working to amend these regulations. See, for example, Lapper 1996b.
2 Compare with respect to the impediments to reform in general, for example, Ogata 1997.

8 MARKET REGULATION

1 Compare for the following as a free-banking proponent Dowd 1996:680–3.
2 Those were the Bank of England Act of 1946, the Banking Act of 1979, the Banking Act of 1987, the Cheques Act of 1992 and the Consumer Credit Act of 1974. See for these and the following information Hall 1993b: 268–9.
3 Hall 1993b lists (in alphabetical order) the Anti-Monopoly Law (1947), the Bank of Japan Law (1942), the Banking Act (1890), the Banking Law (1927), the Banking Law (1981), the Deposit Insurance Law (1971), the Financial System Reform Act (1992), the Foreign Exchange and Foreign Control Law (1947), the Foreign Exchange Bank Law (1954), the Investment Advisory Law (1987), the Labour Bank Law (1953), the Law Concerning Amalgamation and Conversion of Financial Institutions (1968), the Law Concerning Bond Issue by Banks (1950), the Law Concerning Concurrent Operation of Savings Bank Business or Trust Business by Ordinary Banks (1943), the Law Concerning Concurrent Operation of Trust Business by Ordinary Banks (1981), the Law Concerning Special Account of Government Bonds Consolidation Fund (1975), the Law Concerning the Reserve Deposit Requirement System (1958), the Loan Trust Law (1952), the Long-Term Credit Bank Law (1952), the National Bank Act (1872), the Norinchukin Bank Law (1923), the Postal Savings Law (1981), the Savings Bank Act (1890), the Savings Bank Law (1921), the Securities and Exchange Law (1948), the Shinkin Bank Law (1951), the Shokokkin Bank Law (1936), the Sogo Bank Law (1951), the Special Taxation Measures Law (1986), the Temporary Interest Rate Adjustment Law (1947) and the Trust Business Law (1922).
4 A detailed overview of the structures and practices of banking regulation and supervision in the United States, the United Kingdom and Japan is given in Hall 1993b.
5 A certain change in attitude was already observed after the Johnson Matthey Bankers affair. See Hall 1993a: 20–1, and for the Bank's principles in general Bank of England 1996b. Compare for the Bank of England's supervisory practice in the Barings case Fay 1996:110–13.
6 See for the treatment of transnational corporations in Japan in detail Bailey *et al*. 1994:7–45.
7 Bailey *et al*. emphasise that, nowadays, those practices are essential in non-routine cases. If the investment is regarded as routine, the official decision process can be very rapid. See Bailey *et al*. 1994:32.
8 This process is known as *amakudari* or descent from heaven. See for the following Schaede 1994:315, 1996:27.
9 The Old Boys' influence can be considerable. For example, when the presidents of Mitsubishi and Taiyo Kobe Bank decided to merge and asked the boards to agree the Old Boys prevented the merger by vetoing the plan. See for this example, Schaede 1994:315.
10 Schaede 1997 found that although in the commercial banking sector the number of Old Boys hired peaked in 1985 and since then was clearly declining, in 1991 it was still above the figure for 1979. See Schaede 1997:358, Table 2.
11 See for the following as well as for a general survey of exchange restrictions in Japan, Bank of Japan 1993c.
12 The amount up to which no permission was needed was raised from ¥100,000 to ¥200,000 in February 1996. At the same time, the amounts required to be reported quarterly were raised from ¥50 million to ¥500 million. See for this and the following Nihon Keizai Shimbun 1996, Ministry of Finance 1996a.
13 For designated industries such as drugs, weapons, fisheries etc. prior notification to both the BoJ and the MoF is required.

14 See for the classification of designated and non-designated industries in this case Bank of Japan 1993c: 34. Non-designated industries comprise industries relating to national security, like weapons and nuclear power, and others reserved in the OECD Code of Liberalization of Capital Movements such as agriculture, petroleum and leather.
15 There are some emergency rules for transactions under the jurisdiction of the MITI connected with foreign trade and the transfer of mining rights and industrial property and other similar rights which are not listed here. See in detail Bank of Japan 1993c: 17.
16 Tomomitsu Oba was as deputy vice minister for financial affairs involved in drafting the Plaza Agreement in 1985.
17 In course of the banking crisis after the breakdown of the speculative bubble, up to December 1995, the Bank of Japan had payed out nearly ¥1.1 trillion in 'emergency loans' to rescue bankrupt financial institutions. In comparison, the Bank's total reserves from retained profits at that time amounted to ¥3 trillion. See, for example, McGill 1995:97.
18 A detailed description of the system gives Grabowsky 1994. See also Okina 1993.
19 See for the details Reszat 1995:15–17 and the literature cited there.
20 See for a short history of the world's first capital standards Solomon 1995: Chapter 22.
21 See for a particularly sharp critique Hisamizu 1993, and for a moderate consideration of the pros and cons Fukao 1991.
22 Based on an international comparison of stock-market data and wealth effects of bank shareholders Wagster 1996 reached the conclusion that, actually, the Accord did not eliminate the funding-cost advantage of Japanese banks.
23 See for the implementation of the rules in the United States, the United Kingdom and Japan Hall 1992.
24 Capital ratios along the national standard are calculated as 'the sum of capital plus certain reserves as a percentage of the daily average of total assets less some special reserves' Hall 1993b: 154.
25 See, for example, Hall 1993b: 209–13, Evans 1995.
26 Instead of suspending the business other measures such as those for the second group can be taken if either the net value of assets including unrealised gains is positive or is expected to become positive under certain circumstances. See Study Group on Prompt Corrective Action 1996: Appendix.
27 There are estimates that the additional burden imposed on Japanese banks by the increased capital needs will be 0.1 to 0.5 percentage points while the cost reduction as the result of netting will be 0.1 to 0.3 percentage points. See Fukuda, T. 1994.

9 EXCHANGE RATE STABILISATION

1 This has caused experts to question the meaning of measures of central bank independence. See, for example, Fujiki 1996, Walsh 1996 and the literature cited there.
2 Takagi 1991b: 149. Under the provisions of the Foreign Exchange Fund Special Account Law this account has been established to distinguish the operation of foreign exchange funds from the government's General Account. Article 5 of the law states that authority over the FEFSA belongs to the Ministry of Finance. Article 6 states that 'the Ministry of Finance may entrust the operation of the FEF under the provisions of Article 5 to the Bank of Japan' which is actually done. See Kawamura 1996:87–8. See for a general description of the degree and nature of central bank dependence in Japan Suzuki 1989.

3 The FILP is often called the second general account budget with a size of more than 50 per cent of the general account budget. It is planned in parallel with the latter and requires approval by the Diet, the Japanese parliament. See for the details Matsuoka and Rose 1994: Chapters 34, 46, and for an interpretation of the government budget balances Argy and Stein 1997:30–2.
4 The Postal Savings scheme here is a 'special account to counteract the effects of financial deregulation' (Kawamura 1996:97).
5 See as the classic theoretical treatment of the subject of tacit bargaining Schelling 1980.
6 Compare Bank for International Settlements 1996b: 56, *The Banker* 1994a, b.
7 These are the Bank's executive directors' board and a seven-person policy board including two representatives of the Ministry of Finance and the Economic Planning Agency.
8 See, for example, Mussa 1981. The following line of reasoning had been summarised in the so-called Jurgensen Report to the G7 which was initiated by the participants of the Versailles summit in 1982, at a time when doubts about the effectiveness of central bank interventions in foreign exchange markets reached their peak. See Jurgensen 1983. A thorough theoretical and empirical treatment of the issue with a focus on interventions of the Deutsche Bundesbank and the US Federal Reserve can be found in Almekinders 1995.
9 See for a general survey of the theory of signalling Macho-Stadler and Pérez-Castrillo 1997: Chapter 5.
10 A classic example for the portfolio balance approach is Branson 1979. See for the relative importance of the various effects in general, for example, Dominguez and Frankel 1993, Lewis 1995.
11 Those were in April 1975, April 1979, August 1980 and May 1989. Compare the results in detail Watanabe 1994:266–7, Table 11.1.
12 See for a discussion of the applicability of the small-country assumption for Japan in general Reed 1993.
13 This is the idea behind the concept of bounded rationality. See for this concept in general, for example, Simon 1976.
14 This argument does not only hold for the private sector but for policy makers, too. See, for example, Frankel and Rockett 1988.
15 The impression of overall profitability is confirmed for earlier years as well as over different time intervals. See, for example, for the longer run, Hamada and Patrick 1988:119, and for the very short run Goodhart and Hesse 1993:383–4. However, profitability is not always considered an appropriate criterion. According to some authors, it all depends on the relative position of the exchange rate to its underlying fundamental or long-term value, on whether an exchange rate movement is part of a longer-term change in fundamentals or a kind of overshooting phenomenon. Mayer and Taguchi 1983 propose alternative criteria showing that interventions may also be successful if there are no currency gains if they only drive the exchange rate closer to its long-term path. Then, the main problem is to determine this path. In recent years, other approaches have been developed as well considering the effects of interventions on risk premia, asset supplies and the exchange rate variance. As Dominguez and Frankel put it, this is a subject of ongoing research. See Dominguez and Frankel 1993:103–8.
16 For example, Bank of Japan officials were reported attending lectures on the derivatives market by Swiss Bank Corporation officials for this purpose. Compare Daimon 1995.
17 Japan's official foreign exchange reserves, too, are largely held in dollars. Although the figures are not published, there are estimates that 80 to 90 per cent of total reserves are in dollars and the rest in German marks. This share is high in international

comparison. According to IMF statistics, in 1992, only 64.4 per cent of all nations' foreign currency reserves were held in dollars. See Ikeya 1995b.

18 In principle, the question of which policy variables are to be coordinated is left open. See for a general survey of game-theoretic approaches to international monetary policy cooperation Reszat 1986, Nolan and Schaling 1996. Early studies of international macroeconomic policy cooperation are Niehans 1968 and Hamada 1974, 1976. Other major works on this subject are Canzoneri and Gray 1983, 1985, Oudiz and Sachs 1984, Rogoff 1985 and the various contributions in Buiter and Marston 1985.

19 In the literature, the situation is often compared to a 'prisoners' dilemma'. This well-known game-theoretic paradox describes a conflict between individual and collective rationality. Two prisoners suspected of having jointly committed a crime are kept separated and confronted with the alternative to confess or not confess on the following conditions. If neither confesses both will be set free. If they both confess they will face moderate jail sentences. But, if one confesses and the other remains silent the former will be set free and get an additional reward while the latter will be punished severely. Not to confess would require both to trust each other. But, both are aware that if one could expect the other to keep still the incentive would be overwhelming to take advantage of this knowledge and confess. Thus, to play safe, eventually both decide to confess. See for this paradox as well as for possible ways to get off the horns of the dilemma by allowing the game to be repeated, Axelrod 1984.

20 An outcome is Pareto optimal when it is not possible to improve one party's well-being without harming the other. See for the concept of Pareto optimality, for example, Sandier 1992:13–15.

21 See for a short survey of the literature Nolan and Schaling 1996:414.

22 See for these concepts in detail McKinnon 1984, Miller and Williamson 1987, as well as for a general discussion of both approaches Hamada and Patrick 1988 and Ishiyama 1990.

23 See for the various institutions that would be involved in Japan in this case and the resulting difficulties in detail Iwata 168–72.

24 In Japan, this subject has found a strong resonance in academic literature in recent years. See, for example, Inoue, I. 1995, Katsu 1994, 1995, Kwan 1995 and Susaki 1995.

25 The following relies heavily on Kenen 1983 and Katsu 1995.

26 See for the 1994 numbers Katsu 1995:29.

27 Compare also Katsu 1995:29. For example, for Germany, the third-largest exporting country behind the United States and Japan, the shares of D-mark denominated exports and imports over time varied around 80 and 50 per cent respectively. Compare Deutsche Bundesbank 1991.

28 The five currencies in the SDR valuation basket are the US dollar with a weight of 40 per cent, the D-mark with 21 per cent, the Japanese yen with 17 per cent and the French franc and the pound sterling with 11 per cent each.

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SUBJECT INDEX

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