



Capitalism without Capital

Accounting for the crash

Alan Shipman



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Summary: "An unusual consensus has developed among economists that the 'long boom' before 2008, and the subsequent crisis and recession, resulted from a global excess of capital. Over-supply of saving drive down capital costs, encouraging excessively risky investment and preventing the scrapping of outmoded plant. Capital's inexorable growth is also blamed for a prolonged squeeze on wages, rising elite wealth and worsening global inequality. This book explores the obvious clash between such arguments and actual measurements of capital, which show a small and shrinking 'productive' component, and a deepening disconnection between capital accumulation and economic growth. It traces the conflict to the continued absence of consistent definitions or measurements of capital, and neglect of the complex connection between aggregate capital and wealth. Capital 'gains' and 'losses', and the growing domination of income statements by balance sheets, undermine attempts to sidestep the problem by reconstituting economics as a system of flows"—Provided by publisher.

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Introduction

Off the shelf

Early versions of ideas distilled here took shape in the Marshall Library of Economics. The 'Marshall' has, for over 40 years, been housed in the architecturally dubious but intellectually salubrious Austin Robinson Building, with offshooting corridors that run past rooms named after John Maynard Keynes and James Meade. Over the years, the Marshall's book and journal stock has been constantly replaced and updated, so that few of the tomes that informed Economics Triposes of the past now remain on display. Vast amounts of new writing (and some new thinking) have occurred in economics since the library's inauguration, and the edited highlights have trickled remorselessly onto its shelves. Yet while the contents continually change, they have never expanded. The stacks remain far enough apart for natural light to bathe the reading desks, and retain enough empty space to persuade next year's intake that there is still something more to be said.

Although not all can match the Marshall's scenic windows and squeaky floors, other libraries have taken the same one-in, one-out approach to managing stock. I can confirm this from the documentary research that went into this book. Almost all the referenced titles that had been published before 2000 were no longer stocked in libraries, and were eventually obtained as second-hand copies that had been withdrawn and sold by those same libraries (the rubber rejection stamps ranging from Manchester to Michigan).

Libraries' lack of expansion is, of course, an intellectual if not an optical illusion. The Marshall (and its many surrounding libraries)

holds an expanding array of items that are not on display, but stored in basements or off-site archives, to be called back if eager readers with long memories wish to revisit them. Only the miniaturizing wizardry of microfilms, databases and disks have stopped these subterranean storage vaults fanning out into collision with the metro tunnels and mining shafts. Digitization arrived just in time to avert a knowledge-driven deforestation. Now libraries can expand invisibly, as portals to an electronic collection that can grow without limit, until Iceland sinks beneath the weight of its snow-cooled server farms.

The stock of claims to economic knowledge is therefore not as bounded as the Marshall's perennially uncluttered aisles might suggest. Academic and professional economists have been far from unproductive over the past half century, even though they have rendered numerous economies unproductive during that time. Indeed, under ever-rising pressure to publish, they spew out more articles and books than ever, a surge tide from which this slender volume struggles to detach itself.

But the degree course which most of the Marshall's term-time visitors are pursuing does not expand in scale or extend in length. An undergraduate BA in Economics is still completed in three years of three terms, each no more than eight weeks long. Students complain of a growing intensity of work, but they have always done so. The time traditionally set aside for local rowing, brewing, playmaking and late-night crenellation climbing has not been noticeably squeezed. Those who deliver the courses insist that they have relentlessly updated them to include the latest theoretical and empirical advances. So if the standard commodities, wage-profit frontiers, multiplier effects and capital reversals of a generation ago are expunged from today's curriculum, it can only be because they have been encompassed or superseded. Either they are needed no more, or the historians next door can pick them up.

According to its custodians, then, the stock of relevant economic knowledge has not grown. It has merely been transformed within unchanging boundaries of time and space. New breakthroughs shrink past general theories into special cases of one more encompassing, or show them to be wholly dispensable, like bygone chemistries' aether and phlogiston. Mathematics and experimentation, the two levers with which economists seek to shift their ground from social to natural science, have been especially effective (in the view of their

practitioners) – to raising quality while even reducing quantity. The laboratory tests (on computer-simulated economies, and occasionally unsuspecting residents of a real one) reject substantially more past assertions than they accept. The algebraic ‘formalizations’ rid the subject of excess verbiage, ultimately reducing it to a sequence of theorems that a passing linear programmer could master in an afternoon.

While heterodox economists protest that much of value has been ditched to make space for the newly equation-filled orthodoxy, they reinforce the impression of zero-sum knowledge gain by designing courses that teach the mainstream *and* some alternatives and still compressing them into the standard one- or three-year courses. Concerned as they are to reconstitute a critical realism into the subject, a temporal realism rules out any expansion of received wisdom that would detain the learners longer. Lengthening the instruction period is impossible when students’ debts rise in direct proportion to it. Intensifying the injection of new knowledge, to cram more in, would collide with other calls on learners’ time, be it the essential relaxation from study or the evenings behind the counter that are needed to finance it.

Undazzled by the ever more sophisticated models and forecasts, the public concluded from the widely unforeseen crash of 2008 that economists knew a lot less than they thought. So few can plausibly dispute the claim that their stock of useful knowledge can evolve and transform without growing. Many would be surprised to be told it has not shrunk, with new ideas subtracting more than they add. The subject’s greatest architects have always engaged in comprehensive demolition of what previously stood, before beginning their reconstruction. Despite the vast difference in their aims, this was the strategy adopted in common by (among many others) Marx against the free marketeers, Keynes against the ‘classics’ (including Marx), the General Equilibrium and Rational Expectations theorists against the Keynesians, Barro (1974) and Sargent and Wallace (1975) against any advocacy of fiscal policy effectiveness, Robinson (1954) and Felipe and McCombie (2001) against any models based on aggregate production functions and Granger and Newbold (1974) against all previous time-series analysis.

But if economists want this in relation to their own stock of knowledge, they should accept it might apply to other stocks as well.

Capitalism with capital

It is easy to demonstrate, using plausible and transparent measurements, that the average real incomes and living standards of most countries have risen over the past century. The long national income series meticulously compiled by Maddison (2007) and his successors at the Groningen Growth and Development Centre unequivocally charts the growth in per-capita GDP – first in Europe, the US and Japan, then in other former European colonies and China as the ‘great divergence’ starts to narrow. It is much harder to demonstrate that countries are richer because they have accumulated more capital. Growth accounting offers precise empirical differentiation between the ‘extensive’ growth due to assembling more capital and labour and the ‘intensive’ growth from squeezing more output from them. But the assumptions behind such aggregate productivity measures turn out to be problematic. Investment appears closely linked to growth performance, but the link between investment flow and capital stock is surprisingly indistinct.

Substituting the historian’s long view for the econometrician’s data set, Eric Hobsbawm (1977) declared the years 1848–75 to be *The Age of Capital* in England, and the European and ex-colonial countries that were then industrializing around it. It was preceded in his 19th-century trilogy by *The Age of Revolution* (1789–1848) (Hobsbawm 1988) and followed by *The Age of Empire* (1875–1914) (Hobsbawm 1989). Because the revolutions were still having an impact – and in places being re-run – when capital was in the ascendant, it is generally assumed that capital still continued to thrive in the Age of Empire. Many have presented relentless capital accumulation as a motive force behind imperialism, and a structural property that still dominates society today. They have been especially inspired to do so because the thinker who dug deepest into capital, and most fully asserted its historical importance, chanced to arrive in England just as the Age of Capital began, and studied the phenomenon through its peak years.

The Age of Capital may (like Marx) have lasted a little beyond 1875, in Western Europe and North America, and extended into the 20th century for many later-developing countries. But there is a reason for regarding it as past, and giving way to ages in which other features of ‘capitalism’ become more important. Arguments reviewed

in Chapters 1 and 2 of this book suggest that concepts of capital are very much alive, and its relentless growth is still seen as the driving force of both progress and instability in the world today. But Chapter 3 finds equally persuasive evidence that capital as we knew it has gone missing from the system named after it, which manages to keep changing and expanding in its absence. Chapter 4 finds reasons for this in the long-known inadequacy of all methods for defining, measuring and quantifying capital, and the tendency to elide it with profoundly different concepts of 'wealth'.

In Chapter 5, private individuals' growing concern to store and protect wealth, as economies grow, is argued to have profound and neglected effects on the way they grow, and governments' priorities in managing them. The shift in motivation from accumulation to preservation is observed, in Chapter 6, to have caused changes in the structure and regulation of economies that increase their vulnerability to shifts in those hard-to-pin-down capital values. Economists' elegant efforts to explain the world by income flows are thereby subverted by accounting realities at the macro level and accounting subjectivities at the enterprise level. The final chapter reassesses recent turbulence in the world economy as a consequence of capital gains and losses exacerbated by disappearance of capital assets, and the implications of an economy in which public debt grows because private assets can no longer shrink.

Precedents and parallels

The book's title is not original. Michael Hudson used it in an article for *Counterpoint* soon after the 2008 financial crisis, using it to describe banks' still-exorbitant ratios of loans and other assets to core capital – an issue revisited in Chapter 3. It appears as an early chapter subtitle in Nitzan and Bichler (2009), who draw very different conclusions about where it goes and what replaces it. 'Capitalism without capitalists' was a common observation in relation to the Soviet Union and communist-era Eastern Europe (e.g. Eyal et al. 2001), but my aim is to show that it is just as relevant to the world after 1989.

The book's central problem is not original either. It takes others to task for building too much analysis on too imprecise a definition of capital, and then proceeds to slide between different uses of the term in (in)exactly the same way. That may serve to highlight the essential

difficulty of the concept, or just the inadequacy of this conceptualizer. But identifying the full extent of the problem is sometimes the first step towards a solution.

Many of my college contemporaries rose rapidly to form the new generation of leading-edge researchers, some in the natural and some in the social sciences. Those who went into natural sciences tackled the urgent unsolved mysteries of physics, chemistry, biology and cosmology. Extraordinary breakthroughs have resulted from their subsequent discoveries regarding the human (and other) genomes, the evolving global climate, sources of energy, the structure of matter and the workings of the mind. Scientific advances in the short interval since leaving college have led (among many other transformations) to the cure of some previously intractable diseases, the reshaping of societies by mobile telephony, the adventure of the Internet and (as this book was being completed in 2014) the landing of a probe on a comet six billion kilometres from Earth. Many lives have been enriched and extended by those contemporaries' achievements.

Former classmates who went into other social sciences tackled equally important challenges and puzzles relating to the economy. How can we raise the living standards of the poorest countries, and households, to the average (and eventually towards the highest)? How can boom-and-bust cycles be prevented, other than by a creativity-suppressing, life-restricting central plan? What is the right degree of income and wealth inequality, and how can societies be steered towards it without damaging production incentives? How can governments best regulate the growing number of once-public industries now entrusted to private ownership in oligopoly or natural-monopoly conditions? How do we ensure a balance between present and future consumption that conserves the world's scarce resources? What role does the interest rate play in determining this balance (via discount and investment rates), and how is it determined?

Considering this list, two contrasts with the natural scientists' challenges stand out. These were the same issues that economists were grappling with a century ago. And economists of my generation have moved no closer to solving them. Despite having just as much talent and commitment to the public good (if not always to public goods), and an unprecedented battery of algebraic, statistical and computer-simulation techniques, the best economists of my generation delivered answers no more effective than those of their predecessors. Some

notable decisions backed by many or most professional economists – including corporate tax reduction, restrictions on trade-union rights, privatization of public transport and social housing, switching to student-financed higher education, extension of limited liability to partnerships – delivered few or none of the copious benefits predicted to flow from them. And some macroeconomic decisions – including financial deregulation, monetary targeting followed by inflation targeting, and legalization of speculative derivatives trading – led directly to the biggest setback to the world economy since 1929.

Far from delivering new explanations and solutions that were better than the old, today's economists appear to have overlooked – and then painfully, belatedly rediscovered – a number of features of economic systems that were well understood in the 1930s and 1950s. If this book does anything, it identifies some neglected thoughts from the past as a possible way to shed light on the present.

1

An Obvious Excess of Capital

The idea that capitalism can work without capital is clearly absurd. It's got to be there – not just by definition, but because economic activity is stalled without it. When just a few dollars' worth of capital is added to poor people's ingenuity and industry, it can unlock the commercial drive that lifts them out of poverty (Banerjee & Duflo 2011: Ch. 9, De Soto 2000, Yunus 2003). Plenty of informed observation shows that people on low incomes have the incentive and inventiveness to prosper, and it is for want of an – often tiny – endowment of capital that they remain stuck in a hand-to-mouth existence.

It seems equally obvious that richer countries have more capital than poorer ones, and that this explains their greater prosperity. To explain why residents of Lusaka, who know as much and work as hard as their equivalents in London, receive a fraction of the income, appeal is made to the better 'capital equipment' with which Londoners work and the stronger 'social capital' that surrounds them. Economic theory can easily show that it is extra capital that generates extra income. Additional 'physical' capital (capital equipment) raises the productivity of each activity, by extending its reach and enabling a more systematic division of labour. With it, people can engage in more 'roundabout' activity – preparing the ground before they till it, improving the reach of their implements and the quality of the soil when they till. Investment in new capital also drives and delivers innovation, creating new products and new techniques for better replicating existing ones. Additional 'financial' capital speeds up this expansion and upgrading of the means of production, especially by funding and reshaping the firms that organize production.

While there are also dissenting theories that suggest the rich have a need for more capital, rather than more capital making them rich, no-one seems to dispute the association. The labourer with a mechanical digger has (it seems obvious) more capital equipment than the one with a spade; likewise the clerk with a computer compared to the one with an abacus. A college graduate has more ‘human capital’ than someone their age who left school at 15. A networker has more ‘social capital’ than a loner. Oil- and mineral-rich Russia has more ‘natural capital’ than rocky Japan.

The world today (in 2015) is still emerging from a financial crisis that was widely blamed on there being *too much* capital. Analyses of this and several previous crises, whether conducted by friends or foes of capitalism, almost always conclude that modern capital is troubled by its own abundance, sometimes needing to be pruned or culled before it can rally and flourish again. This chapter and the next goes with the overflow, taking a brief tour of recent assessments linking economic downturn to excess of capital. The aim is to give them a fair hearing – and to cover the full range of definitions and measurements of capital – before proceeding in Chapter 3 to show that they may be wrong.

A tragic abstention: ‘global savings glut’

That the world was awash in surplus capital, looking for a safe place to park, was very clear to US Federal Reserve economist Ben Bernanke in early 2005. At the time the US economy was experiencing one of its longest ever upturns, growing steadily since 1993 with only a brief interruption in 2001. This left the Federal Reserve chairman, Alan Greenspan, grappling with an unusual problem. In June 2004 the Fed had raised short-term interest rates in order to slow the expansion, so that it would not be derailed by inflation due to excessive credit growth. But even when it raised the federal funds rate (then its primary monetary policy instrument), long-term bond yields continued declining. Capital was flowing into the market for ten-year Treasury notes and bonds, raising their prices and depressing their yields, when the combination of higher borrowing costs and officially expressed inflation concerns was supposed to send them the other way. ‘What is going on?’ the normally omniscient Greenspan was forced to ask (2009: 177).

Bernanke had a ready explanation for what was happening, which he made public at speeches in Virginia and Missouri in March and April 2005 (Bernanke 2005). A number of large and/or fast-growing economies, especially in East Asia and the Middle East, were saving more than they invested, and running large external surpluses. Their 'exported' savings were flowing into larger, longer-established economies, notably the US, where they drove down interest rates and lowered the yield on bonds and equities. Foreign investors bought more than half of the US\$4.5 trillion of highly rated securities issued by the US in 2002–7, and more than 80% of China's current-account surpluses were channelled into them (Bernanke et al. 2011). When Greenspan lowered short-term interest rates, which in principle should have made it less lucrative for foreign savers to buy US government bonds, they did not keep their money at home but simply switched it towards other, higher-yielding US assets, pushing down yields even on longer-maturity Treasury and private corporate bonds.

The global savings glut (GSG) argument usefully interpreted US economic imbalances – a wide fiscal deficit and comparably large current-account deficit – as signs of American strength rather than weakness that would only be reduced if other countries changed their behaviour. These countries viewed the US as a safer repository for their savings than their own economy, supposedly because of its bigger investment opportunities and better regulated financial system. So they exported 'surplus' savings to the US. The American current-account deficit was then the inevitable obverse of the resulting capital inflow – a consequence of US GDP outgrowing that of other advanced economies, and a perennially strong dollar making imports cheap.

Bernanke et al. (2011) anticipate the criticism that the GSG was insufficient to explain the whole of the accumulated US 'twin deficits', by pointing out that saving eventually became supplemented by borrowing. So successful was Wall Street's financial engineering in creating 'risk free' high-yield products that some investors took out loans in order to buy them, anticipating that the yield would exceed their borrowing cost. This was especially the case in Europe, where governments' efforts to reduce fiscal deficits in preparation for monetary union (in 1999) had depressed interest rates and bond yields.

Europe leveraged up its international balance sheet significantly, issuing, among other instruments, considerable sovereign debt

and bank debt, and using the proceeds to buy substantial amounts of highly rated US MBS and other fixed-income products. In fact, the strong preference of the GSG countries for Treasuries and Agencies appears to have pushed Europeans and other advanced-economy investors, including US investors, into apparently safe ‘private-label’ MBS. (Bernanke et al. 2011)

European investors, in this view, took two additional risks in the US market which Asian and Middle Eastern investors tended to avoid. They diversified from government debt into securitized mortgage debt (believing, misguidedly, that its AAA ratings made it equivalently safe) and took leveraged positions, supplementing their purchases with borrowed money. Leverage not only multiplies any capital gains on an investment, but also multiplies any losses. Emerging-market investors, perhaps more alert to the possibility that credit rating agencies had overestimated the safety of mortgage-backed securities (MBSs), stuck with US government debt despite its lower yields. A popular explanation for this caution is that Asian investors were still raw from the experience of 1997–8, when asset price and exchange rate falls decimated their portfolios, and now prioritized the preservation of their capital over any clever strategies to enhance it.

Saving, investment and capital flows

Worries had surfaced before – after much shorter upturns – about global over-saving, arising from phases of sustained economic growth and putting a premature end to them. The Bernanke–Greenspan explanation of pre-2008 ‘global imbalances’ has been widely endorsed, even by analysts with very different economic and political outlooks. Lapavitsas (2013), from an avowedly Marxian perspective, blames the Federal Reserve for fuelling an asset-price bubble by keeping its interest rates low, but endorses the view that emerging-market savers played a key role in keeping credit unduly cheap even when monetary policy started to tighten. ‘The US bubble was sustained by reverse capital flows from developing countries . . . The poor of the world became net suppliers of capital to the US, keeping loanable capital abundant in the US markets during 2005–6’ (Lapavitsas 2013: 274).

‘Savings glut’ also translates easily into the macroeconomic accounting framework that regained popularity as economists sought to

interpret the ‘international imbalances’ behind the GFC. Fast-growing emerging markets (plus those with oil surpluses and, anomalously, Germany) ran current-account surpluses because their savings (S) substantially exceeded their investment (I). Saving is simply income not currently spent. Investment is income spent with the intention of generating or enhancing future income, rather than just consuming in the present.

By macroeconomic accounting definition, an excess of S over I means that a country will not buy all the consumption and capital goods it produces, and will have to sell some abroad. Its exports (X) will exceed its imports (M), where these are broadly defined to include trade in goods and services, plus inflows and outflows of investment income and other current transfers. A savings surplus ($S > I$) must be associated with a current-account surplus ($X > M$), unless the country’s government absorbs all the private sector’s savings by running a fiscal deficit. If the government balances its budget, keeping its spending (G) equal to its tax receipts (T), then the savings surplus ($S > I$) will be fully matched by the current-account surplus ($X - M$).

All of this can be neatly summarized in the accounting framework

$$(I - S) + (G - T) + (X - M) = 0 \Rightarrow (S - I) = (G - T) + (X - M)$$

If $G = T$, $(S - I) = (X - M)$

[where S denotes saving, I investment, G government spending, T tax revenue, X current-account credits and M current-account debits].

Reckless savers, selfless borrowers

These are merely identities, making no statement as to what causes what. But the ‘savings glut’ hypothesis gives an appealing narrative, from the US perspective. Emerging countries do not invest enough in their own economies. That is partly because America, with its free society, strong property protections, developed infrastructures and wealth of human resources, is a good place to invest, offering relatively low-risk returns. It may also reflect the way that emerging countries’ saving is done mostly by an elite, which prefers to keep the resultant wealth outside the country. These countries’ governments, perhaps stung by the way that their credit line suddenly dried up during the 1997–8 ‘Asian crisis’, kept their budget deficits low, some

even running consistent surpluses. So their private-sector surpluses were not offset by public-sector deficits, and instead spill out across borders, in the form of a current-account surplus inevitably matched by an outflow of capital.

The US then led the 'free' world in taking in that capital outflow – giving it sanctuary in the form of government and corporate stock and bond issues, or foreign direct investment (FDI) opportunities. In doing so, it inevitably ran a current-account deficit, which ensured that emerging markets could sell their net exports, and keep their surpluses sustainable. The US consumed more than it produced so that it could borrow the rest of the world's excess savings, looking after them and letting them generate a return.

Before the 'savings glut' suggestion, foreign observers had often depicted the US as living above its means, borrowing from the rest of the world in order to finance consumption that perennially overwhelmed its production. The flow of savings from lower-income countries to the world's richest economy was often presented as perverse, when lower income was commonly ascribed to lack of capital. Given that low national income had often been associated with a vicious circle in which low income meant minimal saving, and lack of saving denied the resources that could raise income, the US had seemed especially greedy in importing others' savings instead of generating its own.

With a quantifiable savings glut, the apparent selfishness could be reinterpreted as generosity: the US is deliberately running up debts to the rest of the world so that other countries could avoid dragging their own (and the world's) economy into recession through overblown thriftiness. Since savings-glut countries accumulated their external surpluses in US dollars, making it quickest and easiest to reassign them to assets in the same currency. The US offered them a particularly welcoming home through ostensibly open access to the world's largest economy with the biggest and most liquid capital markets.

It was widely noted that Americans were unusually privileged borrowers. Since the world had made the dollar a reserve currency, the US could issue debt externally in a currency it printed domestically. This did not mean it could borrow without limit. When public debt expands beyond a certain level, foreign creditors may come to believe that they will not be repaid, or be repaid in severely devalued money because of dollar depreciation. But once foreign investors had lent

heavily to the US to finance its external deficit, they were effectively forced to continue doing so, to avoid depreciation or default that would devalue their existing assets. Japan's post-1990 stagnation, the design deficiencies of the Eurozone and the inconvertibility of the Yuan meant that, even after its banking-sector meltdown, the US had no rival as a global currency issuer. And in return for its uniquely broad 'seigniorage' rights, America could claim to have shouldered other extraterritorial duties that were noticeably less rewarding, particularly when it came to military expeditions for which allies had the tactical preference but not the troops.

If emerging markets objected to Americans absorbing their savings, they could always (in the GSG view) have stopped the outflow. This would only have required them to invest more at home, and/or to run up larger fiscal deficits – perhaps by financing public services and welfare subsidies (or tax credits) on the scale the US offered its own citizens. The savings glut (and its outflow abroad) could also have been eliminated if saving-surplus countries had allowed their exchange rates to appreciate. This was not in their interests: it would have switched demand from home to abroad, lowering exports (X) and raising imports (M), and dragging savings (S) down to the level of investment (I) by lowering national income. In keeping the US dollar strong, the US thereby helped others avoid recession, while sacrificing its own exporters.

In allowing smaller countries to channel savings abroad, the US enabled them to obtain the known (large) improvements in portfolios' risk/return balance that arise from international diversification (Malkiel 2007: 190–6). Most countries exhibit a 'home bias' in their allocation of savings, keeping most of it in domestic bank accounts or bond issues. Emerging-country governments tend to encourage that bias through exchange controls, and other regulations that make it costly or risky to hold money abroad. Emerging markets seemed to invert this priority in the decade before 2008, their private sectors preferring to send savings abroad. This was often encouraged by their governments, which in larger emerging markets were reluctant to deregulate their domestic financial markets. The US may later have been criticized for irresponsible deregulation, but many of the critics had made use of it before they heaped abuse on it. Although it was doubtless not his intention, producing an America-friendly explanation for Greenspan's 'conundrum' (long-term interest rates still

falling when the short rate was raised) is unlikely to have hindered Bernanke's appointment as new chair of the Federal Reserve when Greenspan retired in 2006.

The rescuers punished

Against the argument that the US had drained and misallocated the world's savings, the 'savings glut' argument depicted America suffering for its noble efforts to spend them. In a vexed succession of acronyms, GSG led inexorably to GFC, which was reaching gale force as Bernanke settled into the Federal Reserve chair. The inflow of savings, made possible by global dismantling of capital controls since 1980, drove down long-term interest rates in Western countries, even when central bankers like Greenspan pushed short-term rates up. Low interest (especially with memories of past high inflation still lingering) promoted private-sector borrowing, especially for speculative investment. For previously risk-averse investors, suffering a decline in bond yields and equity premiums, increased leverage may have been necessary to keep up the return on investment. Higher returns were otherwise only available by moving to riskier investments, including the shares of untested-technology companies and the bonds of governments with poor track records of paying back.

Financial innovation then emerges not as a reckless scheme by profit-driven banks foisted on unwary investors, but a response to those investors' new demand for safe yet high-yielding instruments. Since the US government had closed its fiscal deficit in the late 1990s, restricting its issuance of new AAA-rated Treasury bonds to the amount needed to redeem old ones, there was a danger of global demand overwhelming supply of investment-grade assets. Yields might flatten to the extent that savers were forced to look for better deals in other markets, or even to stop exporting so much capital and invest a bit more at home. But the US financial sector responded to demand by creating a new range of assets to attract those footloose savers, combining the safety of government debt with yields normally associated with riskier private-sector ventures. Their particular breakthrough came in bundling and securitizing residential mortgage debt, much of which was extended top households with medium or low credit ratings and so commanded higher interest rates. By combining these with higher rated residential loans, and making use of

the guarantees provided by government-supported market-makers (Fannie Mae and Freddie Mac), US investment banks delivered a rising flow of MBSs which offered a Treasury-equivalent AAA rating and much higher prospective yields.

Cheap finance then led to a self-compounding rise in asset prices, fuelled by wealth effects and 'equity withdrawal' as inflated asset values provide security for more loans. Central banks, committed to targeting an inflation index that excluded assets, saw no reason to raise their base rates until the asset boom was dangerously advanced. Even when they did, there was a long lag (as the Federal Reserve found after 2004) between rate rises at the short and longer ends, and between higher long rates and a fall-back in borrowing. When credit finally tightened, asset prices fell back down, and the private sector suffered a balance sheet recession – with consumption and investment held down for several years as firms and households paid down debt.

Was it really a glut of savings?

The suggestion that China saved more than it invested in the 1997–2007 period strikes some as improbable, given how heavily China was investing in its own economy at that time. China's investment rate rose to 42.8% of GDP in 2006, from 25.9% in 1990, according to official data (Sun et al. 2009: 1). This may include substantial flowback from its savings outflow, since the US was among the high-income countries that carried out substantial net FDI into China in this period, part-financed by their inward portfolio investment from China. Even so, it appears a remarkable achievement for the country's savings to have risen at an even faster rate.

If any of China's US bond purchasing was by government agencies or state-owned firms, it is possible that the funds flowing into the US were 'printed' in the public sector rather than saved by its private sector. Even if the purchases were mostly by private households and firms, these savings might have been enabled by public money creation.

Attempts by governments (especially of emerging markets) to print money in this way are usually undermined by inflation and currency depreciation. But in China's case, according to the alternative interpretation, currency depreciation promoted the external surplus, boosting exports much more than it raised the cost of imports. 'When

the People's Bank of China (PBOC), China's central bank, created \$460bn worth of yuan in 2007 . . . that \$460bn worth of yuan was not "saved", it was created from thin air as part of government policy designed to hold down the value of its currency' (Duncan 2012).

Returning to the macroeconomic accounting framework, the argument is that monetary expansion gave China a competitive currency that sharpened its export boom, raising the surplus of X over M . This *resulted* in an excess of S over I , because the government did not run a sufficient budget deficit ($G - T$) to offset the external surplus. The apparent savings glut was, in this interpretation, a consequence of external surplus and not its cause.

The GSG authors already recognize that capital flows into the US arose from borrowed funds, as well as savings, attracted by high-yielding AAA assets. While they argue that it was mainly European private and public investors who borrowed to buy into the US, critics suggest that Chinese investors were also doing so. The opacity of Chinese bank and macroeconomic accounting at the time makes this difficult to verify, but the scale of internal Chinese debt revealed since 2008 does give it some plausibility.

These sceptics modify the macroeconomic accounting, so that an external surplus is generated if saving or *fiat money creation* exceeds domestic investment.

$$(I - [S + F]) + (G - T) + (X - M) = 0 \Rightarrow (S + F - I) = (G - T) + (X - M)$$

where F is the creation of new 'outside' money through government borrowing. This would normally be used to finance (and so be offset by) the budget deficit, leaving an excess of private-sector savings over investment as the only explanation for an excess of exports over imports. But there is nothing in principle to stop a government borrowing extra for investment abroad. If, in doing so, it achieves a weakening of the exchange rate that promotes exports more than it raises import costs, then such additional borrowing could have added to the external surplus and the associated capital outflow.

Additional capital outflows need not be limited to fiat money creation by governments and central banks. Bernanke et al. (2011) document the increase in Europe of bank borrowing to finance US asset purchase, implying that 'credit money' also contributed to a capital flow from Europe that could not have arisen from saving (which in

the Eurozone was balanced by investment). In principle, the same could have happened in China – and would help to explain both the extraordinary domestic investment rate that China sustained in 2000–8 while exporting capital to the US, and the extraordinary level of debt within China that has come to light since 2008.

If savers wanted safety, why did they migrate to riskier assets?

While the GSG might help to explain why US government debt yields (on long- and short-dated issues) stayed very low, it is not immediately clear why they should also have contributed to the fall in yields on riskier financial instruments (such as corporate shares, bonds and debt securitizations), which also occurred at this time. The explanations usually given are:

- Near-zero yields on public debt forced other investors into a ‘search for yield’ which increased their demand for riskier assets – and this, in turn, drove their yields down.
- Financial innovation allowed other instruments, including private-sector loans, to be repackaged into products that were viewed as very low risk, sharing the US government’s AAA credit rating.

Looming large among these innovations were new forms of asset-backed security, particularly MBSs and related types of collateralized debt obligation. The perception of these as low-risk assets was promoted by their high liquidity, and tendency to attract investment-grade credit ratings, before the 2008 crash. MBSs’ price strength and liquidity was promoted by the market-making of government-sponsored agencies, Fannie Mae and Freddie Mac. The driving down of yields on these assets, due to pressure of demand, is argued to have deflected investors onto riskier assets in a search for higher returns.

With hindsight, the creditworthiness of MBSs that included sub-prime mortgages is judged to have been underpriced – perhaps because rating agencies had underestimated the capacity of secondary buyers to split off the lower risk tranches, had suffered from a conflict of interest, or had simply made their assessments in a hurry because of the record number of new issues they had to rate. But even if such mistakes had been avoided, a GSG of this sort was

almost certain to end in a credit-driven bubble. An ongoing flow of international savings to US (and European) debt securitizations reduced these countries' costs of borrowing, increased the scale of house-buying and other leveraged purchases, and pushed up the value of the assets being purchased. This increased the borrowing capacity and creditworthiness of those who owned such assets. Homeowners could withdraw the additional equity (or even buy additional properties) by extending their loans, without exceeding the loan-to-value ratios that had previously proved safe. If savings were still in surplus after buying up all the available 'safer' assets, they would inevitably overspill into less safe assets, including riskier versions of the previously safe (such as subprime mortgages, or new loans to previously prime borrowers at a higher ratio to their income than they had previously sustained).

The US financial system could salvage some credit from the product innovations that imploded in 2008, if it had minted these new types of security in response to footloose global savings that had nowhere else to go. US regulators including the Federal Reserve might also appear in a better light if the persistence of low interest rates, and the concomitant rise in asset prices, were caused by foreign-fuelled monetary expansion they could do nothing about. Economists and European central bankers had been sounding caution, since at least 2006, over the rise of global 'excess liquidity', identified by historically high and rising ratios of broad-money aggregates to GDP (Ruffer & Stracca 2006). Even though the increase was dominated by 'inside' money, created by private-sector borrowing and lending decisions, central banks could be asked why they did not do more to soak up the excess. One valid reason was that most had been set inflation targets that were not in danger, giving them no formal reason for raising interest rates or otherwise constraining credit growth. But as these targets are generally set for the medium term (allowing for pre-emptive alarms), stronger ground is bound to be demanded for explaining why the implicit central-bank responsibility for monetary stability was allowed to lapse. It is much more comfortable to argue that monetary policy did what it could, raising short-term rates, and was thwarted by private-sector savers from outside the system – who simply by-passed the low-yielding assets and climbed up the yield curve, pushing its longer end down under their collective weight.

A mistranslation: saving into investment

Invocation of ‘excessive’ saving as a cause of global economic distress has a superficially Keynesian flavour. Keynes (1936) had disinterred the ‘paradox of thrift’, through which the household sector’s efforts to save more are undermined by the consequent drop in demand, which reduces household income. Internationalizing the argument, countries which saved excessively (more than they were willing to invest) created a global drop in demand, putting the world at risk of recession. The risk was averted by the US borrowing and spending the excess savings, plugging the gap in global demand. To maintain the external surpluses that enabled them to save, China and other emerging-market exporters had to finance others’ external deficits, letting them borrow those savings at very low (even zero) real interest rates.

However, the Keynesian flavour quickly sours when savers and their ‘excessive’ thrift are made the starting-point of the story. In the GSG account, surplus savings flow abroad into investment – attracted by the better combination of risk and return in richer countries (especially the US), and efficiently channelled by their sophisticated financial ‘intermediaries’. This sounds inescapably like the pre-Keynesian argument that additional driving sparks additional investment. The enlarged savings flow is assumed to reduce real interest rates, which makes more projects viable, inducing Western firms to raise their capital spending. Investment can now exceed domestic saving in capital-importing countries, balancing the excess of saving over investment in capital-exporting countries.

Keynes (1936) famously identified a fallacy-of-composition in the argument that an increase in the ‘supply’ of saving would push down interest rates and increase the volume of investment. This assumed an ‘aggregate demand for investment’ that sloped downward (investment increasing when interest rates fell), and was independent of the aggregate supply of saving. In practice, this might apply to individual firms but was unlikely to work for the whole economy. Increased saving would reduce aggregate demand, by dampening profit expectations, and knock ‘aggregate’ investment downwards. That might well drive the interest rate down further, but it would work against any rise in investment.

A rise in savings will generate an investment boom only if savings generate investment, through a (neoclassical) sequence in which

extra supply of loanable funds drives down interest rates and stimulates demand for them. This ceases to be guaranteed when savers become functionally distinguished from investors. It is even less likely to occur when savers not only stand apart from investing companies, but reside outside their countries.

In offering an alternative theory, in which interest rates were set by the supply and demand for money, Keynes highlighted the further risk that increased saving might sometimes fail to reduce interest rates in the first place. The 'liquidity trap' was sprung when households and businesses kept their savings in cash, rather than entrusting them to financial institutions that might relend them to investors. This might happen when interest rates were still positive, implying some 'opportunity cost' of holding money stocks – a more serious obstacle to full employment and growth than the 'zero lower bound' that has haunted monetary policy-makers since 2008.

Despite his conviction at the time, Keynes's new theory of interest-rate setting (1936, Ch. 14) was to prove (in his followers' view) one the least satisfactory of his innovations, and not only because the 'speculative motive' for holding cash implied expectations of an equilibrium interest rate whose determination was never explained. The 'marginal efficiency of capital', which determined investment at a given interest rate, still sloped downward like the orthodox demand-for-investment schedule that the General Theory was meant to take issue with. In practice, there was no reason to expect the aggregate investment (or the aggregate capital stock to which it contributed) increase as interest rates fell, for reasons finally set down in Sraffa's (1960) assessment of capital. Every movement in interest rates changed the valuation – hence the 'marginal product' – of a heterogeneous capital stock, undermining any certainty that lower interest rates would lead to higher aggregate investment. (The argument gets further explanation in Chapter 3.)

When finally identified by his successors, this potential misbehaviour in the 'aggregate demand for investment' function reinforced Keynes's fundamental point. The equality between saving and investment flows – an accounting necessary for a closed economy with no public sector, and for the world economy as a whole – was brought about by adjustments in aggregate income. Any attempt to save a higher proportion of national income would, through demand deficiency, drag that income down, bringing investment down with it.

The economy might save and invest a higher proportion of its income, but only because that income had dropped. Conversely, a rise in investment could, by expanding national income, be matched by additional saving even if the savings rate did not rise.

Developments in commercial and central banking since the 1950s have strengthened the evidence that investment generates savings at the macroeconomic level, even if savings seem to generate investment from the individual saver and borrower perspective. Banks do not require deposits to match every loan, or even 'fractionally' cover each loan. Their lending creates 'equivalent' deposits, and is limited only by the need for loans to be profitably repayable, plus any precautionary reserves or leverage ratios that the central bank might impose (McLeay et al. 2014). Saving (and debt repayment) reduce the stock of money, but unless offset by equivalent new lending for consumption or investment.

So while many Western policy-makers were distressed, after 1990, that savings inflows and lower interest rates were not translating into higher investment and growth, they should perhaps not have been surprised. To the extent that this ever happened, it did so under much earlier monetary regimes – notably from 1948–71 when the Bretton Woods system was fully operational, and capital controls restricted cross-border movements of savings. In present conditions, a savings inflow can be expected to flow into higher business investment only if the investment decisions have already been taken, creating the conditions that foreign savers find attractive. If savings flow in for other reasons, there is no reason why they should prompt higher business investment, even if (as in the US before 2008) they drive short- and longer-term interest rates down.

'Financialization?'

Savings become a 'glut' when they are seen to finance other people's consumption (building up debt with no means to repay it) or 'speculative' investment (which, because it ultimately generates as many losers as winners, again builds up unsustainable debt). To this extent Bernanke's assessment therefore fits the experience of the US, where the primary effect was to boost consumption rather than investment. Households obtained more unsecured credit as lower interest rates made it affordable, and more secured credit as lower interest rates

delivered house price increases that enabled more equity withdrawal. When lower interest rates did boost investment, it was mainly in existing assets (retraded shares and resold houses) rather than new assets. And even when investors chose to buy something new, it was more often a newly built home, or a stake in a company that had yet to produce anything (Lazonick & Tulum 2011), than a commercial asset likely to add to GDP.

This was not the first time that large capital-account flows to Western countries had caused asset and consumption booms, rather than investment booms, in recipient countries. Previous waves of Japanese 'surplus' capital had gone a similar way. Even the 'dot-com' boom of 1999–2000, which poured cheap capital into a range of dazzlingly innovative start-ups, produced a stack of casualties for every lasting success. This contrasted with the pre-1970 period, when conditions of low inflation and low real interest rates had been associated with strong and steady 'real' investment across the Organisation for Economic Cooperation and Development (OECD) countries. The consequent GDP growth had helped to maintain the strong demand for capital goods, and the income growth allowing savings to finance these.

So economists are challenged to explain why these favourable conditions have not been repeated, despite real interest rates being kept low for a decade before 2008 (as central banks reacted to low inflation) and for many years afterwards (as central banks used monetary relaxation and 'quantitative easing' to promote recovery when further fiscal expansion no longer seemed an option). Why, even with capital apparently so abundant and cheap, did so much flow into 'unproductive' consumption and financial investment instead of 'productive' investment, including the extra export capacity that might have allowed the US to bring down its external deficit without a 'Great Recession'?

Perhaps the most popular explanation, because it seems to fit a wide range of economic and political perspectives, was that lower interest rates boost the returns on financial investment (in bonds, shares, real estate and derivative contracts built on these) more than they boost the returns on 'real' investment (in new production capacity). Inflowing savings were matched by higher investment, whether as cause or consequence; but it was the 'wrong' sort of investment to expand production and reverse the external imbalance.

This can occur, potentially for long periods, if lower interest rates boost the profitability of 'financial' activity more than that of 'real' activity involving production for sale.

In the 20 years to 1970, financialization appeared to complement production in the OECD economies. Sustained investment in new manufacturing and services generated income growth which fuelled rising demand for financial products: not just savings accounts and other banking facilities, but also financing and insurance attached to the purchase of goods, which their suppliers could provide. Customer credit and leasing became big business for vehicle and equipment manufacturers; for some retailers, insuring goods and services started to command more profit than selling them.

As the world economy slowly recovered from 1970s stagnation, financialization and 'real' production seemed related more by trade-off than creative tension. The incentive to invest in new production seemed inevitably diminished when investing in financial instruments – mostly entitlements to the income from past investment seemed to offer equivalent or higher returns with much more spreadable risk. The idea of separate financial and production circuits has existed for as long as that of 'circular flow'. By the 1990s, then financial circuit – especially in the US and UK – seemed to be generating much substantially more profit (and faster profit growth) than equivalently sized production sectors, despite their extensive cost reduction through offshore outsourcing.

Financialization becomes a problem if the rate of interest on savings (i) matches or exceeds the rate of profit (r). It will then be more rewarding for individuals and businesses to save any surplus income, receiving compound interest, than to invest it for the much more uncertain returns on equity or debt. Classical and neoclassical approaches recognize that r must be substantially higher than i to induce investment, with the differential offsetting risk so that *expected* returns to investment are at least as great as those to saving.

Smith (1979 [1776]) had identified interest, like rent, as a deduction paid out of business profit. Marx (1959 [1894]: Ch. 22) supports the view that r sets an upper limit to i , and will generally be substantially above it. The apparent overturning of this logic since the 1990s, with the 'baseline' of rentier income moving above the reward for entrepreneurship, aroused concern well beyond those still working in the 'classical' tradition. In this view, additional savings were flowing

into investment, but the investment was distinctly 'non-productive'. Its increased absorption by the financial sphere (or circuit) redistributed wealth and income, without necessarily serving the production circuit that actually created wealth.

Conclusion

The idea that recent economic troubles stem from excess capital formed from a global 'savings glut' has found widespread support, in analytical approaches far removed from its originators. Perhaps there unarguably is 'too much' saving when some of it flows into speculative revaluation of assets rather than production of new assets. This leads to a downturn due to deficient aggregate demand, as Keynes long ago predicted – and an especially deep and intractable downturn when preceded by a debt-fuelled asset boom, which decimates private-sector balance sheets (and ramps up government debt) when it subsides.

But does a surplus of saving mean a surplus of capital? The word is subtly slipped in to GSG presentations (and the summary of them in this chapter), mainly when a country's import of saving is described as 'capital inflow', creating a surplus on its 'capital account' which must (by accounting definition) match the deficit in its current account.

For a savings glut to turn onto a capital glut, two further steps are necessary. Savings must turn into investment, and investment must result in net additions to the capital stock. Both of these mechanisms were for a long time central to economic thought, but have taken a battering in recent reassessments.

2

A Still More Obvious Excess: Capital as Wealth

Saving may not translate easily into the ‘real’ investment required to expand production, but it is the basis for personal investment aimed at securing some of the income from production. And whereas physical capital assets depreciate, requiring investment simply to maintain them, financial assets have the potential to appreciate, allowing fortunes to expand even if their income flows partly to consumption as well as reinvestment. In economies rich enough to save, the pool of unspent income steadily rises over time and is channelled into assets designed to protect its value and generate additional income. A consequence is that ‘second-hand’ assets – including previously issued shares and bonds, old houses and classic artworks – can encounter rising demand and appreciate in value despite advancing age (Scitovsky 1994). If these durable private-investment assets are included in capital, its expanding size becomes a source of social as well as economic strains.

Wealth of recriminations: Piketty’s ‘Capital’

Thomas Piketty adopts this wider definition, and traces its significant social consequences, in his phenomenally successful *Capital in the 21st Century* (Piketty 2014). In this assessment, capital is wealth – tradable assets that enable the owner to draw income, independent of any wage they receive for work. Income can be in cash (e.g. interest on bonds, dividends from shares, rent from land) or in kind (e.g. implicit rent from living in an owner-occupied property). Tradability means that money income can be derived from interest or rent from holding the asset, from the proceeds of selling the asset, or from ‘capital gains’

on an unsold asset (when this has appreciated in revalue and the additional equity is withdrawn by securing a new loan against it).

Capital and wealth become interchangeable if (as seems plausible) all production and income are ultimately generated by businesses, so that wealth constitutes ownership (equity) claims on those businesses. Provided their market value matches their book value, which competitive financial markets should ensure in the longer run, national wealth W_{nt} must equal the aggregate market value of the corporate sector, which becomes K_t . Since (by accounting identity) national income equals national output, 'the national wealth–national income ratio $\beta_{nt} [= W_{nt}/Y_t]$ is the same as the domestic capital–output ratio $\beta_{kt} = K_t/Y_{dt}$ ' (Piketty & Zucman 2013a: 11–12). Y_{dt} is assumed to emerge from an aggregate production function in which capital K_t and labour L_t combine within those corporations. Private-sector financial claims (to corporate ownership), expressed in relation to national income, are thus set equal to the stock of corporate capital, expressed in relation to the output that flows from it. A financial ratio is equated to an engineering ratio, through the power of financial markets, to put accurate money values on a heterogeneous physical stock.

By equating capital with wealth, Piketty is able to supplement conventional estimates of the past and present capital stock (only recently launched by most statistical offices) with data from private estate valuations. These generate a long historical time-series of capital stock for several countries (the US, Canada, Germany, France and the UK), usable alongside the long historical series for GDP developed by Angus Maddison (GGDC 2014, Maddison 2007). Combined, the two series produce Piketty's now-famous empirical observation that richer European countries' ratios of national capital to national income followed an italic 'U-shaped' path after the onset of industrialization. For Britain and France, the capital–income ratio (which Piketty terms β) hovers around 700% until the early 20th century, rapidly drops by more than half (to less than 300%) after World War 1 (1914–18), then gradually but inexorably climbs back towards its 'Victorian' level, reaching over 600% by 2010. Germany does better at restraining the post-war rebound in the ratio, but it still rises from a low of 230% in 1950 to over 400% in 2010.

For the US, the path of capital–income ratio is less a valley than a Bactrian camel, rising from around 300% in 1810 to 'twin peaks' of around 500% in 1910 and 1930, dropping below 400% during

World War 2 (1939–45) and rising steadily thereafter back towards 500%. Canada exhibits a flatter version of the European U-shape, its capital–income ratio dropping from around 550% in 1920 to slightly over 300% in the 1970s but rebounding above 400% by 2010.

By equating wealth to capital, and reinterpreting theories linking capital to economic growth, Piketty provides a new explanation for the Western world’s rising inequality of wealth and income. This had been well documented in his previous research (e.g. Atkinson & Piketty 2009) and that of others (e.g. Stiglitz 2013). In parallel, empirical work on social mobility found that it was slowing down, and even starting to reverse, in parts of Europe that has practised ‘social democracy’ as well as in the US ‘land of opportunity’. This undermined one traditional defence of inequality, that it reflects and rewards differential effort, provided places of higher wealth and power are open to all who strive. A second traditional defence, that inequality creates incentives that drive faster economic growth, had been weakened by the widening of inequality in economies which (after 2008) were measurably shrinking. Piketty includes, among many offerings, a theory of growth that shows it generating inequality rather than following from it.

Because the ownership of capital is concentrated among a relatively small elite, income from capital is concentrated, compounding the rise in inequality of ‘earned’ incomes due to executives’ and professionals’ pay rising faster than that of the employees below them. Because ‘human capital’ is excluded from the measure (because it is not tradable), this income inequality cannot be ascribed to higher-paid workers being longer trained or better skilled and so contributing more to workplace productivity. It is connected primarily to their possessing greater wealth. ‘Rentiers’ who live on unearned income, enabling an educated leisure that made them the lynchpins of 19th-century literature, have survived a taxing interval to thrive again in the 21st century. More remarkably, they have widened their wealth differential in a post-crisis age of near-zero interest rates – precisely the conditions in which Keynes and other technocrats predicted their demise.

Wider wealth, by definition

Whereas the ‘global savings glut’ presented capital as a financial stock, built up by saving and invested in public or private securities,

Piketty uses a definition that encompasses physical stocks as well as financial claims to the income derivable from those stocks.

I define 'national wealth' or 'national capital' as the total market value of everything owned by the residents and governments of a given country at a point in time, provided that it can be traded on some market. It consists of the sum total of nonfinancial assets (land, dwellings, commercial inventory, other buildings, machinery, infrastructure, patents, and other directly owned professional assets) and financial assets (bank accounts, mutual funds, bonds, stocks, financial investments of all kinds, insurance policies, pension funds etc), less the total amount of financial liabilities (debt). (Piketty 2014: 48)

The netting-out of liabilities implies an elimination of corporate bonds (and other private-sector debt), which represent assets to the buyer and equivalent liabilities to the issuer. Government bonds still count as net private wealth, having no strictly equivalent private-sector liability (provided the heroic assumptions of 'Ricardian equivalence' with future tax liabilities are not fulfilled). This allows Piketty an entertaining tour of late 18th- and 19th-century European literature, whose protagonists' adventures are often bankrolled by their steady income from government bond holdings (with dramatic plot twists if an overstretched Treasury encounters repayment difficulties). Public debt is an especially lucrative private asset when governments maintain a good record of redeeming their bonds, while having to pay a relatively high interest rate because of suspicions that they may default.

Equity (shares) issued by private companies can also count as net wealth, since the issuer has no obligation to redeem them (or even pay any dividends on them) while the buyer can hope to recover the investment by reselling them. So estimates of national wealth can include the 'equity' in publicly listed firms (what is left when liabilities are subtracted from assets) and in private property (the value of land and buildings minus any loans secured against them).

One drawback of using long wealth and income series, dating back to the late 19th century, is that they compress the final 20 years in which financial innovation generated huge growth in 'derivative' financial instruments. These are contracts based on future delivery

of real or financial assets and/or payments triggered by changes in the price of those assets. Whereas the face value of corporate equity and bond issues is restricted to the perceived value of 'real' assets they are issued against, there is no obvious upper limit to the issuance of derivative contracts. Put crudely, any number of credit default swaps can be issued against a particular bond, and any number of contracts-for-difference placed on a particular price index, just as any number of bets can be made on a particular event. In principle this does not matter, because every party with a winning position in a derivative contract has a counterparty with offsetting liability, so that such contracts should net-out from national wealth in the same way as corporate bonds. The extreme damage to the balance sheets of banks and households when asset prices fell (and taking some counterparties down with them) suggests that some derivatives had been miscounted as net wealth. But that interruption is too recent to dent the inexorable post-1950 ascent of national wealth (in relation to national income) for all countries in Piketty's study.

'Human capital' (skills, knowledge and qualifications) is excluded from Piketty's definition – on the basis that it is inseparable from the people who acquire it, so cannot be bought and sold between them or preserved after they die. Similarly, 'natural' capital (reserves of fossil fuel, mineral deposits, forests, fresh water) is not included, except to the extent that its value is reflected in that of tradable land. But 'intellectual capital' – legally constituted products of human knowledge such as patents, trademarks and copyrights – can be included as wealth: separability from their creators means they can be traded, licensed-out for royalty payments and/or incorporated into products (or the machinery and infrastructure that make those products).

Privatizing wealth and bringing it home

Piketty's results show that public capital – government-held assets minus public debts and other liabilities – had largely disappeared (by 2010) in the economies under study. 'Public capital in most developed countries is currently insignificant (or even negative, where the public debt exceeds public assets)' (2014: 48). Much of this was due to the post-war sale of profitable public-sector assets, leaving governments with only the less-saleable ones, and the debts and pension obligations taken over from some state-owned enterprises to allow

their privatization. Although they financed some government debt repayment, as well as tax cuts, such sales subtracted at least as much from public assets as from public liabilities, doing nothing to improve public-sector net worth.

Before the financial crisis that began in 2008, gross public debt was already on an upward long-term trend, as governments borrowed for 'investment' in assets that were increasingly intangible (public health, education, mobility, institutional quality) and had no resale value to merit inclusion in a balance sheet. After 2008 there was a jump in public debt in most OECD countries, as it was hurriedly substituted for private debt to rescue banks and companies whose corresponding assets had suddenly wilted. Those latest increases in public debt acted (intentionally) to bolster private-sector net worth, while eroding and often eliminating that of the public sector. So governments' holding a share of national wealth was a strictly 20th-century phenomenon, unknown to the Victorians and fully over a few years into the new millennium.

Piketty also shows that countries' (command of) foreign capital had dropped to virtually zero in 1918 and, after a small and temporary interwar revival, did so again in the two decades after 1950, largely because of foreign war and decolonization. Few countries now 'own' significant chunks of other countries' territory or the physical assets located on it. Financial instruments *could* be a significant component of foreign capital, as holdings of bonds in foreign firms and governments would not be offset by equivalent domestic liabilities. But in practice, such foreign financial holdings tend only to be extensive for the small number of countries (outside Piketty's sample) which have large sovereign wealth funds accumulated with the proceeds of past mineral exports. Multinational companies might own a growing number of assets abroad, but they are not the type of asset that adds much to total wealth, under this way of counting it. So contemporary wealth has in large part been brought back within national borders and restored to private ownership after reversing a brief incursion by the state.

As a result of excluding human capital, and netting-out public capital and most financial capital, the national wealth that Piketty catalogues and quantifies eventually comes down to 'farmland, housing (including the value of land on which buildings stand) and other domestic capital, including buildings used for business and the

associated land, infrastructure, machinery, computers, patents etc.' (Piketty 2014: 119). But farmland now makes a negligible contribution to industrial countries' wealth, its market value shrinking to less than 2% of GDP in the UK, France, Germany, the US and Canada.

So the 'wealth of nations' on this comprehensive measure consists predominantly of residential housing. 'Other domestic capital', including machinery, equipment and intellectual property, remains a significant component. But in none of the selected countries has it grown significantly (in relation to GDP) since 1950; and where growth has occurred, much is due to the rise in value of commercial real estate, also included in this category. Since 1950, housing has (on Piketty's measure) been the main source of national capital growth on Britain, France and Germany. Only in the US has the increase in capital value been evenly spread across housing and other domestic capital.

Very special properties

The bias towards residential real estate in Piketty's capital measure appears inevitable given his conflation of capital with the market value of personal wealth. House prices have risen significantly in real terms across Europe since the mid-20th century. The capital goods deployed by industry have not risen in price to a comparable extent; some, notably electronic and computing devices, have actually cheapened, especially when their unit value is adjusted for performance improvement. Moreover, since Piketty expresses capital as a percentage of national income, his presentation favours 'unproductive' capital that raises the capital-income ratio over 'productive' capital that might reduce it or leave it unchanged. A run-up in house prices will inevitably raise the capital-income ratio because it represents an inflation in capital values which does nothing directly to raise national income. Homeowners' higher spending due to 'wealth effects' and equity release will be largely offset by the higher housing costs of non-owners, and any gains on the demand side may be offset by setbacks on the supply side, especially from the brake on labour mobility when rented accommodation is scarce and expensive. In contrast, investment in capital goods will tend to generate new output, leaving the capital-income ratio unchanged or even lowered.

Residential housing becomes the biggest component of Piketty's capital after 1950, even though there is a strong economic case against including this in definitions of national wealth. It can be argued that housing represents 'productive' capital, in the same way as factory and office buildings, because it supplies 'housing services' which ultimately improve people's ability to work as well as their quality of life. Some of the rise in house prices since the 1950s reflects genuine improvements in houses' 'productivity' and contribution to labour productivity – improved interior equipment and external environment. But the rise in prices even of unimproved homes suggests that this has been mainly due to rising demand (in relation to supply), promoted by easier mortgage-loan availability. In effect, house price rises mostly reflect the increasing cost of 'housing services', implying a fall in the efficiency with which average houses deliver these.

The predominance of price effects means that it is not at all clear whether housing – though it is undoubtedly a component (often the biggest) of individual wealth – should be counted as making any contribution to *national* wealth. A rise in house prices redistributes wealth to the owners of multiple homes (or houses larger than they need) from those who own none. But for owner-occupiers (the majority of households in most high-income economies), a house price rise merely means a rise in the cost of 'housing services', transferring income to the owner from the self-same occupier. A 'wealth effect' on aggregate consumption demand, when house prices changed, requires certain patterns of heterogeneity in household numbers and types (Buiter 2008).

House price appreciation therefore differs significantly from stock price appreciation, which in principle can represent a (perceived) increase in the future value of output from listed companies which makes stockholders better off, without non-stockholders becoming worse off. It is true that house price appreciation enables owners to borrow more (presumably for consumption), through increased collateral enabling 'equity withdrawal'. But this merely redistributes consumption across time, perhaps enabling a temporary rise in spending, then enforcing later restraint when the loans are repaid. A 'bubble' in house prices, raising them above some definition of fundamental value, can produce a temporary wealth effect (Buiter 2008: 16), but again the effect lasts only as long as the bubble, giving

way to a negative wealth effect when house prices 'correct' and shrink owners' equity thereby forcing them to save more in order to restore it.

Capital values?

The tendency of houses' unit prices to rise, while that of capital goods tends to fall (because of expanding supply and advancing technology), highlights an inherent problem with measuring capital by current market values. Piketty's paradoxical result – that rich countries suffered a fall in capital productivity – arises from his decision to equate capital with wealth and to 'mark to market' the identified capital stocks. Giving them a monetary value is essential for his project; there is no other way to add up a heterogeneous bundle of houses, factory buildings, machines, patents and plots of land. But when this is the market value – the sum that each item would fetch if it were sold on an open market – some obvious problems arise.

The hypothetical sale process would produce very different results, depending on the level of aggregation of these non-financial assets. Up to a certain level of aggregation, the whole is more than the sum of the parts. A firm (or other organization) should be worth more than the individual buildings, machines, land and intellectual property that make it up – otherwise, in a profit-driven market economy, someone would make extra money by buying it and breaking it up. Some of the premium of the firm's price over its component prices arises from its human capital component, which Piketty deliberately does not count. But some of the premium is associated with the firm's particular configuration of component assets.

Above a certain level of aggregation, the assumed market value of assets will tend to be above the value they would actually command if sold. Sales begin to have 'market impact', pushing down the achieved price, when a significant proportion of holders try to sell close-substitute items at the same time. The reason for most asset-price bubbles deflating suddenly is that the number of owners selling (to 'take profit' or avoid a suspected correction) builds up until their sales have negative market impact, which triggers more panic selling. So the notional value of estates, measured case-by-case against a stable market background, may be substantially higher than the realizable value achieved in actual sales.

Capital–output ratio: invariantly rising?

There is a more fundamental problem with monetary valuation of capital, made more poignant by Piketty's use of his national capital calculations to mount an attack on the rising inequality of wealth and income distribution. The value of capital depends on the income distribution, so cannot logically be arrived at before that distribution is known. This was made clear two generations ago in the 'Cambridge capital critique' (Cohen & Harcourt 2003), whose inadequate interpretation and representation in Piketty's work drew loud laments from otherwise sympathetic critics (Galbraith 2014).

By skating over the transition from capital as objects to capital valuation, Piketty is able to resurrect a very old one-sector growth model as his newly unveiled 'second fundamental law of capitalism', which states that

$$K/Y = \beta = s/g$$

where K is the national capital stock, Y is the national income (GDP), g is the growth rate of GDP and s is the net national saving rate. s , or S/Y , represents the combined flow of savings by households (setting aside unspent income) and firms (reinvesting profit), netted for capital depreciation. Some of this flow is needed just to replace capital that wears out, estimated at 10–15% per year in advanced economies (Piketty 2014: 168), so it is only net saving that actually expands the capital stock.

Economists with long memories soon recognize this as the Harrod–Domar growth model, independently originated by Roy Harrod (1939) and Evsey Domar (1946). Piketty does, indeed, name these two progenitors on page 230, only 64 pages after their equation makes its first appearance. To resurrect it as the 'second fundamental law', Piketty has to adopt the Harrod–Domar assumption that the capital–income ratio K/Y is constant over time. This requires that the capital stock's growth rate (dK/K) equals the GDP growth rate (dY/Y), so that, on rearranging the fundamental equation we get

$$\begin{aligned} K &= sY/g = S/g \\ \Rightarrow S &= gK = (dY/Y)K = (dK/K)K = dK = I \end{aligned}$$

where I is the net investment.

Without this assumption, of the capital stock growing at the same rate as national income, the accounting identity $S = I$ would not be sustained through time. But it is an uncomfortable assumption on which to base an analysis which goes on to show how the capital–income ratio has in fact varied substantially over time. The discrepancy occurs because Piketty has applied a one-sector growth model to economies that consist of many sectors and thereby elided the conceptual distinction between capital as a physical stock and as a financial stock. By assuming only one capital good K producing (along with labour) all the national income Y , Harrod and Domar avoided the problem of aggregating heterogeneous capital goods using a monetary measure.

The constant capital–output ratio implies that capital cannot be substituted for labour (or vice versa), so that a given percentage growth in GDP requires the same percentage growth in the capital stock. Piketty’s growth model thus assumes a zero ‘elasticity of substitution’ between capital and labour. But he is keen to cite empirical evidence that ‘over a very long period of time, the elasticity of substitution between capital and labour seems to have been greater than one On the basis of historical data, one can estimate an elasticity between 1.3 and 1.6’ (2014: 220–1). This assumption is necessary to explain the observed rise in capital’s share of national income, since an elasticity of just 1 would lead to workers’ and capital-owners’ shares of national income being fixed over time (the implication of the Cobb–Douglas production function, as Piketty acknowledges on pages 217–20).

Substitutability that allows capital to keep finding new uses, in which its productivity (Y/K) is higher than in older uses, is important for upholding Piketty’s ‘first fundamental law of capitalism’

$$\alpha = r\beta$$

where α is the share of national income that goes to capital, r is the rate of return on capital and β (as before) is the capital–income ratio. This is, as Piketty acknowledges, an accounting identity: capital income is rK , so capital income as a share of national income (α) will be $rK/Y = r\beta$. Conventional economic theory (and a number of radical alternatives, including Marxian theories) assume that the return on capital r will fall as the quantity of capital K rises in relation to national income – an assumption that Piketty endorses (2014: 215–16).

With elasticity of substitution of 1 (or below), any rise in β will be offset (or more than offset) by a fall in r , so that capital's income share α stays unchanged (or declines). To arrive at the steady rise in α since the 1970s – which occurs across the high-income economies, according to Piketty's calculations – it must be assumed that accumulation of capital K does not significantly reduce the return on capital r . An elasticity of substitution greater than 1 is important for ensuring that K can keep growing without a significant drop in its return. Its necessity has also distressed many who would like to endorse his conclusions, since there is no empirical support for such a high degree of capital–labour substitutability, and its existence would rule out steady-state growth (Patnaik 2014, Rowthorn 2014).

With this assumption, Piketty arrives at the central message of his text. The real return on capital (r) is relatively unchanging at 4–5%, greater than the long-term GDP trend real growth rate (g) of advanced economies, which has been 2–3% since the initial post-war boom subsided. For those with little or no capital, the only source of income is employment – and the growth of employment income is, in aggregate, bounded by the growth rate of GDP. For those who live wholly or partly off income from capital, a return in excess of the growth rate makes it possible to live off the interest (and dividends) and still reinvest enough to maintain or expand the original capital. When $r > g$, the unearned incomes of those plugged into the financial economy will steadily rise compared to the earned incomes of those who must work in the real economy.

By asserting high substitutability between capital and labour, Piketty is able to assume that advanced economies' return on capital is around 5%, unaltered by variations in the quantity or productivity of capital. A rise in the capital–output ratio K/Y therefore raises capital's share of national income, accounting for his empirical results. But that *assumed* 5% return on capital raises a second substantial difficulty with his analysis, again arising from the elision of physical capital and financial measures of capital. 'One cannot add up the values of capital objects to get a common quantity without a prior rate of interest, which (since it is prior) must come from the financial and not the physical world . . . if the actual interest rate is a financial variable, varying for financial reasons, the physical interpretation of a dollar-valued capital stock is meaningless' (Galbraith 2014).

Is investment bad for the productivity of capital?

While highlighting his many disagreements with the economic mainstream, Piketty concurs with the accounting convention that capital is a stock built up by flows of investment and that investment is financed by (therefore equating to) private-sector saving. His empirical demonstration that rich countries' ratio of capital to output fell to unusually low levels in the mid-20th century and then climbed back towards to 'Victorian' levels in the early 21st supports strong policy implications but has troubling economic foundations. With capital defined as wealth, countries' K - Y ratios show a surprising inverse relationship to their rates of investment (gross capital formation as a percentage of GDP). 'After World War 2, capital/output ratios . . . stayed low for several decades, despite (at least in Europe) unprecedented fixed investment ratios – while they increased, depending on the country, after about 1970 or 1980, exactly when the investment rate started to decline' (Knibbe 2014: 113).

The observation that capital-to-GDP ratios are lower when countries' investment-to-GDP ratios are higher need not be paradoxical, or even surprising. It merely means that the productivity of capital (measured as output per 'unit' of capital, expressed in money terms) is directly proportional to the rate of investment. This can happen if investment expands the productivity of physical capital faster than it expands the stock of physical capital, by enabling the scrapping of less productive equipment and the deployment of more productive replacements. It could also happen, with no change to physical productivity, if investment changes relative prices so that the price of outputs rises relative to the money values ascribed to workplace capital.

Or it could happen if a change in interest rates results in *both* higher investment *and* a change in relative prices that boosts the value of Y more than the value of K . However, this would still require the effect of higher investment in expanding Y to outweigh its effect in expanding K . Neoclassical one-sector growth theory suggests that a rise in the investment rate (I/Y) raises the growth rate of Y only temporarily, until the economy has moved to a new steady-state equilibrium with a higher capital-labour ratio. So unless something is also happening to raise labour productivity or total factor productivity, it is not clear whether higher investment rates will permanently expand

the productivity of the capital stock. Such an outcome would sit less comfortably with the neoclassical implication that countries' growth rate will converge as their per-capita income (and capital stock) rises, with the more 'capital intensive' countries having to invest more just to maintain their larger capital per unit of labour.

Piketty is keen to emphasize his departures from neoclassical growth and distribution theory, despite his apparent acceptance of the link between capital and labour income and their 'marginal productivity'. But his account of rising inequality requires that the rate of return on capital (r) holds up as the ratio of capital to national output (β) increases. If r fell as β rose, capitalists' share of national income (α) would not necessarily keep rising as he predicts. A continued rise in the share of capitalists' income in national output, while the ratio of capital to national output is rising, certainly requires neo-classical assumptions to be ditched: here are either increasing returns to capital (as a factor of production) or no solid link between a factor's income and its marginal product. One central message of the 'Cambridge critique' – that the concept of marginal product of capital (and labour) has no meaning when factors are measured in money terms, at the macroeconomic level – would have served the analysis well, had it been deployed.

After the initial euphoria over Piketty's powerful conclusions (and wide circulation), some questions have arisen as to whether his 'laws' of capitalism are any more robust than others advanced in a more social-scientific past. The criticisms summarized above can mostly be traced to his decision to treat capital and wealth interchangeably and to give insufficient attention to problems in measuring capital. Both problems will be further pursued in Chapters 3 and 4.

Overaccumulation all over again: Brenner's tale

In arguing that capitalists' share of national income can keep rising as the amount of capital rises in relation to national income, Piketty makes a decisive break with previous analyses that first put capital at the centre of economic growth and technical change. For 'classical' theory, which laid the foundation for now-mainstream 'neo-classical' approaches and for that of Marx, capital's rate of return is liable to fall as it accumulates. A rising capital-income ratio, far from signifying and amplifying the triumph of rentiers and entrepreneurs,

indicates a falling productivity of capital which lowers its return and existentially threatens those who live off it. Individuals associate capital with wealth, and want to accumulate more of it. But as societies acquire more capital, it stops enriching them and starts to impoverish. Some economists have told this story with alarm, others with a note of celebration.

Without strong assumptions to protect the rate of return on capital (r) from rising abundance of capital (K), there will be an inverse relation between them. Capital's return will fall as its quantity increases, due (among other things) to rising demand for capital goods and raw materials (which increases their prices) and greater competition between expanding companies (which erodes their profitability). Diminishing returns to 'factors of production' as their scale increases (other factors held constant) is a staple assumption of neoclassical analysis, but one that sits equally happily with most Marxian approaches.

Marx's return

Before the modern concern with scarcity, economics was mostly pre-occupied by surpluses (Martins 2013). Marx, in particular, traced economic growth to:

- human effort that created a surplus of production, beyond what had to be immediately consumed for survival;
- before capitalism, a class system that consumed the surplus or invested it unproductively, in lavish houses and cathedrals; and
- under capitalism, an inhuman class system that allowed a small group to extract the surplus, reinvesting it in ways that brought more money for themselves and little benefit for those it had been taken from.

Marx predicted that the capitalists would reap the whirlwind when their unchecked reinvestment led to another surplus – of productive capital stock. Increasing amounts of industrial capital would cause a fall in its rate of return, or rate of profit. Whether traced to over-production (competing capitals flooding the market with goods, so that their prices fell) or underconsumption (exploited workers being unable to buy the extra goods their expanding factories were producing), the ultimate problem arose from the same excess of capital.

Followers of Marx have competed to identify updated variants of his thesis – new ways in which economic success leads to accumulation of capital until it is too abundant for its own good, despite industrialists' efforts to cull it at home or offload its surplus output to the distant abroad. The option of 'venting' surplus capital abroad through foreign investment, identified by Hobson (1902) in an analysis much admired by Lenin (1996 [1916]), was dealt a severe blow by the dismemberment of empires after 1945. The option of culling broke down because owners became too attached to their old plant and machinery and were insufficiently ruthless when superior technologies came along. Capitalism lost its power of creation through insufficient commitment to destruction.

Brenner's reversioning

Brenner (1998), in one of the most extensive historical analyses before the 2008 crash, argues that capital accumulation inflicted peacetime damage far more comprehensive than the war damage of the mid-20th century. He sets out to explain how the major capitalist economies of Europe, North America and Japan destroyed themselves by not destroying enough of their capital, until they sank beneath its weight.

His analysis begins with a brisk denunciation of previous Marxian explanations for crisis, centred on the 'supply side' effects of capital accumulation. These typically highlight the way that investment drives up the demand for labour, reducing unemployment and raising employees' bargaining power. Workers find it easier to unionize and push for higher wages, even though the productivity of the last to get jobs is likely to be lower than those recruited earlier. Employers tend to concede wage demands, passing on the cost as price rises, because the cost of strikes is so high when production is running at full tilt. Capitalists are thus confronted with a profit squeeze, which eventually chokes off their accumulation. Allowing an inflow of migrant workers might lessen the problem for a time, but if international accumulation drove other economies towards full employment this wage-restraining labour pool would start to dry up.

In identifying flaws in this approach, Brenner draws on concepts not dissimilar to orthodox growth theory. Capital investment raises the demand for labour, but it can also raise workers' productivity

by giving them more capital to work with. So while accumulation helps them demand more pay, it also helps employers meet those pay demands and still make profit. Collective bargaining may even rescue the system from a demand-deficient downturn if wages per worker failed to keep pace with output per worker. Investment also allows the introduction of labour-saving technologies, enabling some workers to be sacked if their wage demands escalate. So it is not clear why any build-up of capital should undermine itself by causing labour shortage and accelerating pay. Ricardo, one of Marx's economic inspirations, had initially argued the opposite – suggesting that installing new machinery would create additional demand for labour, and only later went on to describe conditions in which it might not, leading instead to technological unemployment.

Having challenged the possibility of excess 'labour demand' causing capital accumulation to undermine itself, Brenner presents an alternative argument linking profit to production and pricing levels. The problem arises with 'cost cutting technical change', which enables firms that adopt it to lower their cost of production. If market prices for these firms' products stayed unchanged, they would earn a higher rate of profit. Therefore, profitability across the whole economy would rise. This gain would be amplified in the longer run because the innovating firms' higher profit would allow them to expand. Others would meanwhile shrink unless they copied the innovation to boost their own profits.

In practice, Brenner argues, market prices will not stay unchanged. Competition forces the innovating firms to cut their prices in line with their costs. Innovation therefore does not increase any firm's (or the economy's) profit. At best it protects them against an erosion of profit, due to competition which – with the emergence of global free trade – now takes place between as well as within capitalist economies. Competition among capitals, more than struggles between capital and labour, becomes the principal threat to capital's ascendancy and rate of return.

The fall in prices (as they follow costs downwards) will push down the profits of higher-cost firms that have not made the innovation. But even if this forces every firm quickly to adopt the latest technology, they do not immediately scrap all the existing capacity that embodies earlier, now out-of-date, technologies. Some of this fixed capital is, Brenner argues, 'already paid for' (1998: 26). Fully

amortized, with any loans to purchase it fully redeemed, this older capital is effectively free of any overhead cost, and can still contribute positively to the firm's profits if its output sells for more than the cost of staff and materials put to work on it. Other, more recently installed, fixed capital equipment may not be fully paid for. But this leaves it 'requiring interest payments that must continue whether or not the capital is in use' (1998: 26). So the same limited calculus applies; this inferior machinery will continue to be run, rather than scrapped, for as long as it makes an operating profit (which in neo-classical terms just means unit sale price exceeding average variable cost excluding interest cost).

Firms' individual financial interest thus leads them to keep out-moded capacity running, even though this goes against the financial interest of the sector and the economy as a whole. *'If they possess fixed capital*, firms which sustain reduced profitability as a result of the introduction of lower-cost and lower-priced goods by cost-cutters in their line *cannot* be assumed to respond by more or less immediately leaving the line; this is because it is rational for them to remain in the line so long as the new, lower price allows them to make at least the average rate of return on their circulating capital' (Brenner 1998: 26, emphasis in original).

Colloquial use of the abstract term 'capital' encourages observers (and especially critics) of capitalism to regard it as a fluid force or essence, constantly shifting between firms and morphing between sectors in pursuit of higher returns. This is especially tempting when capital is regarded principally as a sum of money, which is only ever invested with the intention of generating more money (M-C-M' in Marx's terminology, where C is an intervening stage at which the money has been invested in commodities with the aim of making a product for profitable sale or enjoying a revaluation before resale). Brenner reminds us that even if capital does in principle have such general fungibility, it in practice takes specific forms within business organizations. For people within the firm, capital – their own skills and equipment – is the consequence of that investment, and the challenge for survival is to stop the holders of capital from liquidating that investment.

While the owners of such companies might view them as mere units in a portfolio, to be sold and substituted at will, those who manage them have an interest in defending their boundaries and

preserving their size. If capital is withdrawn from one company and sent to another, in a very different sector, those who currently manage it will not be transferred and regenerated with it. They have a professional (or personal) incentive to keep it in its present place, or let it travel only a short distance into 'related diversification' over which they can still claim competence. By the late 1990s 'the corporations that dominated manufacturing across the advanced capitalist world had, through years of experience, built up invaluable intangible assets in their own line but not others – information about markets, relationships with suppliers and customers, and above all technical knowledge. They could therefore hardly have been expected to close up shop merely because the returns to their existing fixed tangible stock suffered decline' (Brenner 1998: 147). Indeed, firms worsen a problem that begins with innovation by making responses that include 'accelerating technical change through refusing to reduce the rate of growth of investment' (Brenner 1998: 148). Faster technical change, again sensible at firm level, only exacerbates at system level the insufficient shake-out of outmoded capacity.

It could be noted that, for many years before and after the crisis year of 2008, managers were happy to withdraw financial capital from their enterprises in order to repurchase shares. They had no problem returning capital, in the form of money, to shareholders who could then redeploy it to other parts of the economy. But this change in their companies' financial structure (substituting debt for equity if the buyback funds were borrowed, shrinking equity if the buyback were profit financed) was partly designed to defend the firm and its management against the withdrawal of capital in its 'physical' and 'human' forms. Repurchasing outstanding shares meant reducing external shareholders' influence and their scope for downsizing the company or 'delaying' its managerial ranks.

While the extent of Japan's post-1990 stagnation was not fully appreciated when Brenner wrote, it subsequently featured widely in other versions of the 'insufficient scrapping' argument. Financial institutions that had often acquired shares in companies, as well as lending to them, did not want to damage their balance sheets by admitting that their holdings were devalued or worthless. So they refused to foreclose on such enterprises, keeping them alive and thereby preventing their capital (and labour) being redeployed to more profitable sectors.

Optimistic American commentators insisted that the same could not happen in the US because stronger shareholders acting in competitive markets (for 'corporate control' as well as bonds and shares) would force the immediate disposal of old capacity that was merely breaking even. Whole businesses were expected to 'fail', the outdated tail preventing the state-of-the-art head from staying above water, if attachment to existing customers and technologies stopped their management embracing the new and erasing the old (Christensen 1997, Sobel 1999: Ch. 13). But in practice, wrong-footed corporations rarely disappeared; they inadequately adapted, innovating just enough to keep their old operations alive. Microsoft and Nokia, who were overtaken but stayed in the race, proved much more typical than the comprehensive exiters like RCA and Wang.

Salter revisited

Although Brenner does not refer to it, a very similar process had been sketched out 40 years earlier in the then very un-industrial (though undoubtedly industrious) city of Cambridge UK. Salter (1960) made the simple but significant observation that when more productive tools and techniques arrive, businesses do not instantly scrap all the old ones and replace them with the new. They keep the old machines running for as long as they can generate average revenue above average variable costs. 'Capital equipment in existence earns rents in a manner analogous to land. For this reason, the immediate general adoption of new techniques which require investment is uneconomic since new plants will only be constructed when receipts are sufficient to cover all outlays, while existing plants will remain in operation so long as they earn a positive rent, even though their productivity is lower and their operating costs higher than a modern plant' (Salter 1960: 65). Industries' output is kept higher, and their market prices and profits lower, than in a situation where all older capital goods are scrapped when higher-productivity replacements become available.

The incomplete-scrapping mechanisms, and conclusions drawn from it, are essentially the same as Brenner's, with Salter (reflecting his times) seeing scope for lengthy 'tails' of inefficient-but-profitable equipment due to relative absence of international competition and consequent scope for product differentiation to keep prices above average costs. The Salter 'tail', revived by Brenner, is an example of

'the history of a process of accumulation' (Robinson 1980: 57) having an impact on the economy's present performance. The legacy of old equipment, not convertible to the latest technology or immediately replaceable by it, keeps most industries displaced from any profit-maximizing 'equilibrium', as depicted in orthodox theories of the firm and in (neoclassical) growth theories based on an aggregate production function.

Diminishing returns re-expanded

Brenner offers a new (or refined) firm-level foundation for a long-established economic idea: that the return on capital – the rate of profit – tends to decline as the stock of capital grows. The intuition is at least as old as Marx, but entirely compatible with the 'neoclassical' principles that supplanted Marx's 'classical' approach. These tend to include constant returns to scale (a doubling of capital and labour inputs doubles output, leaving these factors' marginal products unchanged and equal to the average), but diminishing returns to each factor (capital's marginal product falling as its ratio to labour increases).

The principle is often introduced with appeal to simple physical-capital examples, such as shovels handed out to construction workers. Each shovel's productivity (earth moved per hour) will rise or at least stay level until every worker has one. Thereafter, deploying more of them will add little at the margin and will drag the average down. (Extra shovels might at some stage even reduce productivity at the margin, as one in each hand makes it harder to dig than one between two.) It is then retained as 'capital' expands to become the whole economy's stock of capital goods, measured in money terms. From there, it is easily applied to capital as an investible financial fund, looking for applications to the real economy. The first investment goes into the most lucrative projects, and the firms that promise the highest distributable profit because they are first in their industries with maximum market power. Subsequent investments must go into projects further down the expected-return list and to firms facing tougher competition, resulting in lower rates of profit or interest. Eventually, the next available investment is no longer worth making because the expected return would be greater if the funds were merely deposited (saved) with interest for the same length of time.

Diminishing returns are curable, at the whole-economy level, only by reversing the growth in capital, so that the same aggregate profit is spread across a smaller stock. Marx and those who followed up his concerns (notably the most ecumenical of Austrian economists, Joseph Schumpeter) identified a number of ways in which returns to capital were periodically revived by scaling down the amount of capital. War was perhaps the starkest, technical innovation the smartest. Invention of new products and processes can re-create the uncontested markets that yield high profits, enabling mature 'sunset' firms and industries to be closed down and their capital transferred to the vibrant 'sunrise'. Salter's tail and Brenner's legacy capacity undermine this seamless transfer. Because existing firms defend themselves, innovation prompts deployment of new capital without sweeping away the old.

Whether wrought by the 'creative destruction' of innovation or the more destructive destruction of war, such wholesale culling of capital is no longer tenable in the richer countries of the OECD or in many others that aspire to such riches. The principal reason is a change in the nature of share- and bond-holders, who now straddle the once stark division between 'them' and 'us'. A century ago, companies' equity and debt were narrowly distributed among a small group of generally wealthy investors. Few ordinary households had comparable holdings of wealth; where they did, it was mostly tied up in government debt, bought mainly through insurance funds or savings banks. So the interest and dividends from corporate capital went mainly to an elite, rich enough to hold portfolios that would not crumble if a few of their shares wilted or bonds defaulted. A clearing-out of redundant physical capital, by downsizing or bankrupting the firms that had clung to obsolete technology, could be achieved without socially disruptive effects on those who drew income from capital.

Today such a culling of unprofitable plants is rarely palatable because shares are held by pension funds and other institutional investors representing a far broader segment of society, including many employees. While individual plant closures may still be admissible, the widespread elimination of whole firms because of excess or inferior capacity is made ever harder by the financial interests tied up in those firms. Only a few non-financial firms are 'too big to fail' and are publicly rescued when bankruptcy threatens. When this is

done, for example, to carmakers in the US and coal mines in Europe, it is generally to protect labour incomes (and the ‘multiplier effect’ keeping alive other jobs around the plant) as much as shareholder incomes. But when asset prices as a whole are under threat, due to loss of confidence in equity markets or restriction of credit for buying real estate, political intervention to protect large shareholders is increasingly common. The widespread use after 2008 of public funds to purchase troubled private assets, and quantitative easing to ensure low interest rates, was motivated in large part to reverse an asset-price fall, and thereby maintain capital’s rate of return without the need to scale it down.

Perhaps in consequence, the profit squeeze depicted by Brenner – and not inimical to mainstream growth theory – does not bring the system down, even when structural change severely restricts its scope for culling excess capacity. But profitability does not lead automatically to investment, even when firms’ capital costs are ostensibly low. If the accumulation of physical capital does not depress corporate rates of return, the overhang of wealth – built on entitlements to the income from that capital – may still do so.

Conclusion: wealth versus capital

The seemingly contrasting accounts reviewed in this chapter – one showing how ‘financial’ investors can enjoy a steady high rate of return while relentlessly accumulating assets, the other showing ‘real’ investors punished by competitive accumulation – are not as incompatible as they might seem. The return of the rentier, chronicled in Piketty’s work, results from accumulated personal fortunes bidding up the price of real estate and other assets (including stocks and shares) whose supply does not respond to demand. The plight of the productive entrepreneur, depicted (with little remorse) by Brenner, is the obverse side: returns on investment in new capital subdued by the resilient performance of the old.

Conventionally viewed, a buoyant equity market means a low cost of capital that encourages companies to invest. Indeed, the investment theory based on Tobin’s ‘q’ assumes that firms will invest whenever the market valuation of their shares rises above the replacement cost of their tangible capital, lifting the q ratio above 1. But in practice, a rising price and falling yield on existing shares may make

new corporate investment harder to justify: rising equities expand the liability side of the balance sheet and may even turn company's net worth negative (Godley & Lavoie 2007: 30), while the falling yield on existing shares sends a negative signal on what new issues might bring. The average corporate capitalists who stay connected to the real economy can at best expect their income growth to match that of the real economy. If the rate of return on financially invested wealth is higher, any corporate trading surplus seems better applied to financial investment. Widespread evidence of 'financialization' (Epstein 2005, Palley 2007) suggests that managers had already made this connection, even before Piketty presented his evidence for the excess of r over g .

But a paradox emerges. In a world supposedly awash with capital, companies find it too expensive to invest. By implication, banks and capital markets cannot profitably extend sufficient credit to them. Capitalists' strategy appears to be aimed at minimizing capital requirements. Wealth expands everywhere, except in the operations on which its existence and income depend.

3

In Practice It's Scarce

If there was really a surplus of capital in the late 20th and early 21st centuries, someone forgot to tell those running the world's banks and non-financial businesses. They continued to behave as if capital were scarce and expensive, and needed to be carefully conserved. Economic problems since the early 1990s can be linked to a shortage of capital more plausibly than to any surplus.

Capital shortage is a familiar concept in relation to lower-income 'developing' countries. There, the tragic shackling of people's initiative and drive for betterment, for want of additional capital, is obvious to any sympathetic observer. 'The major stumbling block that keeps the rest of the world from benefiting from capitalism is its inability to produce capital,' says the Peruvian economist and social activist Hernando de Soto (2000: 5). MIT economists Abhijit Banerjee and Esther Duflo got the chance to test this proposition when the microlender Spandana agreed to offer its services in a randomly chosen half of the 104 neighbourhoods of Hyderabad, while withholding them from the others. 'People in the Spandana neighbourhoods were more likely to have started a business and more likely to have purchased large durable goods, such as bicycles, refrigerators and televisions' (Banerjee & Duflo 2011: 171). Few deny that capital is a limiting factor in the early stages of development, disputes arising only on where it is best deployed and whether individuals, big companies or the state are best placed to make good use of it.

Richer economies are deemed to have reduced or resolved their capital-supply problems – through decades of accumulation which create a large, long-lasting 'stock' of capital and the development

of capital markets to conserve and reallocate that stock. Incentives to accumulate and to allocate efficiently are assumed to have been raised by strengthening shareholder and creditor rights, and making property rights easily defensible and tradable. The attraction of sophisticated financial systems to other countries' savers and investors could even mean that a rich-world capital surplus is the complement to a poorer-world capital shortage, because of 'perverse' flows of capital from regions of scarcity to regions of abundance, once international capital controls are removed.

But as with productivity growth during the first wave of computerization, the rich world's surfeit of capital is visible everywhere except in the economy. Businesses, banks and economies as a whole are run as if to minimize any capital requirement. This behaviour hardly changed when stock markets boomed during the 'great moderation' of 1992–2007, driving down the cost of equity for firms that issued it. Nor did it change when interest rates, the cost of borrowing for investment, fell to record lows during the booms' deflationary aftermath. At a time when the world was supposedly awash with capital, first because of savers providing too much and then because of central banks disgorging too much, financial and business enterprises were acting as if capital were their main constraint, a limiting factor requiring minimal use.

Banking without capital

Perhaps the most extreme and consequential form of capitalism-without-capital was practised by many of the world's banks, in the two decades before 2008. Their widespread need that year for rescue by capital injection, followed by international regulators' imposition of higher minimum capital ratios, highlights the extent to which banks had made loans 'secured' against assets that had been severely overvalued – and, in some cases, lent with no security at all. A small fall in the value of the assets acquired through this lending was enough to drop them below liabilities, threatening a large-scale insolvency until governments stepped in to swap good public bonds for bad private debt.

The missing capital in this case was more specifically 'core Tier 1 capital', subscribed by shareholders and central to the capital ratios prescribed by central banks under Bank for International Settlements

coordination. Shares constitute capital that is taken in and need never be paid back. This capital 'core' therefore ensures that assets exceed liabilities, creating a safety margin within which a fall in asset values still leaves the bank with positive net worth.

Without shareholders' equity, the loans to customers which constitute a bank's assets would be entirely matched by the borrowings (from depositors or financial markets) that notionally finances those loans and constitute the bank's liabilities. A bank without equity whose assets shrank would have to reduce its liabilities proportionately to stay technically solvent. Such a bank might stay afloat if its remaining good debtors paid enough interest to finance all obligations to its creditors and if it correctly managed to balance the repayment of loans against the redemption of customer deposits. But if (perhaps because of a shock, like falling house prices or rising oil prices) doubt sets in about borrowers' ability to repay their debts, asset values will fall, punishing any lender with no equity buffer.

Erosion of core capital leaves banks with a very fragile shield against any loss of asset value, or any rise in liabilities. The 2008 banking crisis (with epicentres in the US and Europe) is usually traced to an unexpected fall in banks' asset values, at a time when their shareholders' equity (the main source of core capital) had dropped to a historically low proportion of their assets. Asset values fell because of a drop in property prices, notably in the US and the UK, which left substantial numbers of mortgage borrowers unable to service their debts. This reflected the tendency for these borrowers also to be operating at very low levels of equity, with loans covering most of their homes' purchase price. High loan-to-value ratios often went with high ratios of debt service cost to income – especially for the subprime borrowers who had opted for interest-only mortgages, relying on the resale price of their home to repay the principal when it fell due.

For banks, the situation had been worsened by successful lobbying to introduce 'risk weighting' for assets. In effect, government bonds and other assets with a top (AAA) credit rating were treated as having little or no risk, and not requiring any equity to be held against them. As the long boom at the start of the century led to a general improvement in credit ratings, risks were perceived to go down and capital requirements fell. Only after 2008 did it transpire that many 'AAA' debt securities contained lower-quality (even subprime) tranches,

and that some governments were not incapable of becoming insolvent – partly because they had to underpin banking sectors whose assets substantially exceeded their GDP.

Many banks had also managed – within the accounting rules – to disguise the growth of their assets in relation to core capital by shifting assets off their balance sheets. An especially dramatic shift had been achieved through the assignment of securitized debt to ‘special purpose vehicles’, which combined tax efficiency with a pleasing (but illusory) appearance of risk transfer. When brought down by widespread default among the ‘assets’ that were to service their debts, these vehicles often sprang back onto the balance sheets of the banks that created them. The proportion of assets covered by core capital turned out to be much lower than any previous ‘stress tests’ had revealed.

After their problems developed, banks’ core capital ratios were found to average little more than 5%, some having leverage ratios (of unweighted assets to core capital) barely above 3% (Lewitt 2010: 231). By implication, asset values no greater than these percentages could wipe out the average bank’s equity, leaving its solvency under threat. This motivated the Bank for International Settlements, in its revised Basel III directive, to set a minimum core capital ratio of 7% of risk-weighted assets (raised by up to 2.5% if credit growth requires countercyclical action), to be attained by 2019. Some national regulators went further, demanding higher core capital ratios and/or an additional financing strand of bonds that could be converted into equity if this started to run short.

Managers have a clear incentive for running down an enterprise’s equity if their performance is being measured by ‘return on equity’. When profit or returns are to be expressed as a proportion of equity, reducing the equity raises the rate of profit or return. So pay schemes that linked managerial remuneration to returns on equity were another focus of attack after the 2008 events. A warning had been sounded years earlier by the collapse of Enron (2001), Parmalat (2003) and a number of other (mainly US) enterprises which had borrowed heavily for investment while shrinking their equity in order to maximize its return. In some cases, extreme leverage – assets financed almost entirely by debt, with little equity – has been disguised by moving debts off the balance sheet into special purpose vehicles that misleadingly appeared to transfer liability from the firm.

Running-down of equity and its replacement by debt were consistent with the aims of the 'shareholder value' movement, which promoted return on equity as the principal measure of managerial efficiency. Taking on additional debt had been viewed by shareholder-value promoters (notably Jensen 1989) as a way to ensure that the firm's free cash flows were channelled to investors, rather than retained by management for unproductive investment or lavish expense. Executive shareholdings were also extended as a way to keep top managers' interest aligned with shareholders' interest, with share options designed to ensure that they kept to a 'long term' value maximizing strategy. However, substituting debt for equity boosted executives' equity-linked pay while eroding the gap between assets and liabilities. A small drop in asset values could close that gap, leaving too little for all the liabilities to be redeemed.

Even without any pressure on managers to raise equity returns, banks (and non-financial companies) have an incentive to minimize their core equity holdings. The perception of core capital is that it 'sits' on the balance sheet doing nothing productive and locking up funds that could be earning a return. Similar redundancy affects the 'reserve assets' that banks are required to lodge with the central bank to ensure liquidity. So the ratio of liquid reserves to assets has trended downwards (to well below 10%) in most high-income countries, its decline appearing to be another feature of financial and general development. In principle, the need for equity as 'core capital' disappears if an enterprise's balance sheet is perfectly hedged, with assets equal to liabilities and exactly matching their fluctuations in value. Banks, and some non-financial companies, tried to move towards this through the increased use of derivatives after they were deregulated, appearing to feel safer with a shrinking equity buffer even when no attempt was made to move liabilities off the balance sheet.

Wisdom (and regulation) after the event suggests that core capital ratios for 'systemically important' banks need to be much higher than those that prevailed before 2008. Some commentators have looked approvingly at Switzerland, whose substantial banking sector was unmoved by the crisis, perhaps because the banks on its soil had core ratios averaging 15% in the decade leading up to it (BIS 2013). Where cracks appeared, it was in banks that had moved to weaker regulatory ground partly in order to run at lower ratios. Martin Wolf, a participant in the UK's Independent Commission on Banking which

in 2011 recommended only a mild increase in capital ratios, had by 2014 decided that 100% backing of assets by core capital might not go amiss (Wolf 2014). Sir John Vickers, who chaired that commission, did not go quite so far, but still suggested in 2013 that core capital should ideally rise to 20% of assets (Jenkins 2013). While most were still talking about a ratio to risk-weighted assets, there was also widespread sympathy for a 'leverage ratio' that would limit the absolute ratio of assets to core capital, in case none of the AAA borrowers turned out to be immune to default.

The specification of these ratios highlights the problem of definition in debates about capital. Core capital, predominantly shareholders' equity (or a mutually owned company's reserves), is expressed in relation to assets, which are mainly loans owed to the bank. A sliver of core capital ensures that assets exceed liabilities, which are mainly customer deposits or loans from other banks. For the system as a whole, unless the country is a significant net creditor in relation to others, banks' private-sector assets will be offset by liabilities. Particular importance is therefore assigned to holdings of public debt (which features without discount in the calculation of risk-weighted assets) and to equity as a source of funding. Equity capital is 'core' because, once it is subscribed, there is no obligation to refund it or to pay out any return on it.

In the rush to patch up the banking system after the 'global financial crisis', it is easy to neglect the reasons why capital ratios were allowed to fall so low. One motive was undoubtedly expedient. Commercial banks were struggling for continued relevance (and profitability) in the late 1990s, as a result of financial market deregulation. They had been extensively disintermediated by bigger business clients, who could go straight to the bond markets to finance most of their fixed capital needs and to the commercial paper markets for short-term working-capital needs. In the US, higher-net-worth households were also starting to walk away from their banks, using money-market funds as a higher-yielding alternative to traditional current or savings accounts.

To catch up with these clients, many commercial banks were propelled into investment banking, an option made available in the US with the repeal of the Glass-Steagall Act in 1999 and already available in Europe. But the commercial banking side still needed a source of profit to replace that of the blue-chip corporates. The most visible

solution was an expansion of home loans, moving onto territory previously left to specialist lenders such as thrifts in the US and building societies in the UK. Retrospectively, the consequent property bubble was easy to see. Expansion of home loans pushed up the price of housing, which enabled more borrowing by existing homeowners ('equity withdrawal') and by marginal borrowers who might be able to finance their repayments in part through the appreciation of the homes they bought. Subprime loans may have been recognized, even when packaged into investment-grade securities, as speculative instruments whose repayments relied entirely on house price inflation. But there was still an incentive to make them, if the granting of a loan generated commissions and if they could be securitized and resold before any repayment problems came to light.

There was a more principled reason for running down core capital – its greater cost in comparison with debt. The costs of debt should in theory have risen above those of equity as its ratio to equity rose because of increased risks of bankruptcy – an idea familiar at least since Miller and Modigliani's (1958) foundational paper on capital structure. But this safeguard against excessive borrowing at firm level may become inoperative at the macro level because of offsetting monetary policy decisions. Once a whole banking system is low on core capital, so that a small fall in asset values could overwhelm it, financial stability requires a safeguard against such falls. By 2001 this safeguard was established as the 'Greenspan put', an implicit assurance that monetary policy would also be loosened to prevent sudden asset-market corrections. The task had devolved onto monetary policy as policy-makers persuaded themselves that fiscal expansion would not be effective against such shocks (and, in the Eurozone, set upper limits to fiscal deficits to prevent its even being tried).

Banking's longer history is one of finding ways to economize on capital so that communities with small amounts of it can prosper by making it work harder. In the classic 'goldsmiths' tale', loans are initially backed up 100% by deposits. One trader's saved surplus is lent to another, the loan officer's skill being to structure a loan that will pay back (with interest) in time for the original capital to be available again when the depositor returns to collect it. The bank is solvent at all times, since each deposit is matched by a loan, and its liquidity will not be troubled provided borrowers repay before depositors return.

Then the goldsmiths discover that most depositors return rather infrequently, so that the same capital can be safely re-lent to several borrowers. 'Fractional reserve' banking is invented, enhancing banks' ability to finance the growing demand from mercantile and industrial entrepreneurs. Even under a gold standard, this move makes the supply of credit responsive to demand – laying the foundations, when gold convertibility is abolished, for the supply of credit and 'inside money' to become endogenous to private-sector activity.

Increasing their effectiveness further, bankers then start to supplement their customer deposits with loans from other banks, subscribed via the wholesale money markets. The 'customer funding gap' between loans to customers and deposits taken from them rose steadily from the turn of the century, but excited leisurely debate about whether wholesale loans were a cheaper and safer way to finance lending than deposits, rather than raising alarms. In the UK, whose banking followed the US route into wholesale funding at an especially fast pace, this funding gap rose from near zero in the late 1990s to a peak of over 25% of assets (around £900 billion) in 2008. Its subsequent fall to less than 10% of assets by 2011 still left it above historic levels and was achieved mainly by a substantial reduction of lending (especially to non-financial companies and overseas investors) (Bank of England 2011). Relaxed monetary policy ensured that cheap wholesale funding remained available. Deposits could also be attracted at relatively low cost, the fall in asset prices forcing many households to save more of their incomes despite these falling in real terms, and faster inflation making real deposit rates negative.

So despite their near-death experience, most large European and American banks were disinclined to raise their core capital any further than the minimum their regulators now required. By 2014 a rising tide of evidence suggested that Chinese banks had expanded leverage and reduced core capital even further than the West's before 2008, making them comparably vulnerable to any fall in the value of their assets, in which real-estate loans played a similarly dominant role.

Growing without capital

Banking operates largely on credit, even after its early-century reminder of the need for some core capital. This may be a truism, and alarming only if viewed in isolation. The economy that banks lend

to still contains a wealth of 'real' assets that are not offset by liabilities and whose value arises 'objectively' from the flows of goods, services and income they can produce. It is often against this equity that lenders secure their debt.

Taking stock of the world's resources at the start of the new century, the World Bank (2006) set out to calculate total wealth, defined as the net present value of all future consumption. Formalized by Weitzman (1976), this measure assumes that consumption is the principal source of satisfaction or utility, and so the ultimate purpose of economic activity, which people maximize through their saving and spending decisions. Investment is assumed to be necessary to enhance future production, and saving – the sacrifice of present consumption for enhanced future consumption – is a necessary counterpart to investment.

Although this sounds like the neoclassical presumption that saving is needed to generate investment, it need not be so. The accounting identity between S and I , shared by Keynesians and post-Keynesians (e.g. Moore 2006: Ch. 7), is also compatible with the idea that saving (as present consumption sacrifice) is essential to growth. The important presumption is that investment drives growth, by enhancing future production. Growth implies that future consumption exceeds present consumption, which requires net investment.

The (Solovian) neoclassical growth theory had suggested that an increase in the saving rate has only a transitory effect in boosting the growth rate, its longer-term impact being only to raise the capital-labour ration associated with any particular growth rate. In contrast, the 'Keynesian' Harrod–Domar model (resurrected by Piketty 2014) makes the growth rate directly proportional to the saving rate. But Weitzman's argument uses real capital in its widest sense – human, social, intellectual and natural (among others), as well as plant and machinery. If capital were just a machine, higher future consumption might be achievable without net investment, by merely reconfiguring the existing capital stock to use it more efficiently (thereby overthrowing any fixity in the capital–output ratio). With the wider definition, such reconfiguration would still require net investment, in whatever form of capital is needed for the efficiency-raising reorganization.

The World Bank's intended innovation was to define and measure saving more accurately than had previously been achieved, by

applying a measure of 'genuine saving' consistent with Weitzman's definition. 'Genuine' saving augments the conventional national saving measure by including additions to human capital (from education spending), as well as net investment in physical capital. But it also takes account of subtractions from natural capital stocks, including consumption of fossil fuels and deforestation. Future consumption flows are discounted by the rate of 'time preference', which captures the extent to which consumption today is preferred to consumption next year. If consumption grows steadily, the time preference rate is also the 'social' rate of return on investment (World Bank 2006: 144).

For its 2006 study, the World Bank used consumption data for 1998–2000 (readily available in national accounts) to calculate initial consumption and applied a time preference rate of 1.5%. By deriving this rate from outside the model, it sidestepped a problem of circularity that had come to light decades earlier. To derive the social rate of return on investment within the model, we would need to divide the income flow by the stock of capital in each period. But calculation of that stock, at its present value, requires knowledge of the rate of return.

This comprehensive definition of saving reduces the risk of under- or overstating its contribution to growth, by ignoring one of the types of capital that countries build up over time. The contribution of saving to growth might be exaggerated, for example, if only human capital investment is ignored and only physical capital investment counted. Or it might be understated if unsustainable natural-resource consumption is allowed to count towards growth. So a 'genuine saving' measure is, it can be argued, more likely than narrower saving measures to identify any link between saving and growth. Since this consumption-based calculation represents capital in its widest form – natural resources, human skills and intellectual property as well as the plant, buildings and machinery from which production proximately flows – separate identification of the sources of wealth requires further calculation. The stock of plant and equipment was separately calculated using the perpetual inventory method – on which more will be said in the next chapter.

Despite deploying the wider measure, the World Bank study found that rates of 'genuine' saving had no significant influence, after 1980, on rates of GDP growth for high-income countries (World Bank 2006: 75, 82 and Figure 6.5). As the genuine saving is calculated

from domestic investment and consumption decisions, this cannot be ascribed to richer countries 'importing' the savings of others. In any case, the sample included countries of the Eurozone whose external accounts have long been balanced (and which may even be a net exporter of capital, when hidden deposits are unearthed – Zucman 2013) as well as rich countries with external deficits like the US and UK. Across the sample, abstention from present consumption was largely de-linked from future consumption possibilities. 'For high-income countries as a group . . . factors other than simple asset accumulation are clearly driving future welfare' (World Bank 2006: 82–3).

It is possible that the connection between saving and growth has been undermined in rich countries because the savings get wasted, rather than productively invested. Net investment (expenditure on new capital equipment minus depreciation) might exaggerate the actual addition to the capital stock because some of the new equipment is not productively used. Expenditure on education might exaggerate the actual addition to human capital, if some of the knowledge and skills acquired are of no use in any workplace. Inconsistently, given its netting of physical-capital investment, the World Bank uses a gross measure of additions to human capital, ignoring the fact that some people retire, die or lose their skills while others are acquiring new ones. It also assumes that all education adds to productivity. 'It assumes that a dollar of educational expenditure translates into a dollar increase in human capital. Studies in both rich countries and poor countries indicate that this is a poor assumption' (Ferreira & Vincent 2005: 741).

The problem of savings and investment being wasted, so that capital stock grows on conventional measures (of input) when nothing is done to raise output, has long been noted in relation to lower-income countries. Investment expenditures may not entirely end up in the intended machinery or human skills, which may have an effective lifetime and rate of capacity utilization much lower than is obtainable in principle. Censuses or surveys of capital equipment are difficult to conduct and can easily exaggerate by underestimating depreciation (Ward 1976), even if there is no dispute on the discount rate applied to determine their present value. Egregious examples of countries that managed to save despite their poverty and then blew the savings – on machines they could not maintain, schools they could not staff and dams that silted their rivers up – were the inspiration half a century

ago for the intermediate technology movement (Schumacher 1973). But the World Bank's 2006 exercise *did* find genuine saving making a significant contribution to developing countries' growth. It was only at higher levels of per-capita income that the relationship broke down. Above that point, countries seem capable of saving without investing, or of reaping the rewards of investing without prior saving.

One possible explanation is that, perhaps with the help of 'appropriate technology', low-income countries have learnt to make productive use of their machinery budgets and classroom time, whereas high-income countries now engage in baroque gadgets and completely non-vocational education. The argument is consistent with the frequent mismatch between increased state spending on education and national productivity trends (e.g. Wolf 2002). But it is somewhat undermined by the determination with which China and other fast-growing emerging markets have encouraged inward investment from Western countries and tried to replicate their educational standards, first by sending their elites to be taught in their schools and universities and then by replicating these on home soil.

Some countries have been observed to maintain perennially high saving rates and disappointingly low growth rates – sacrificing present consumption, but getting no reward through enhancement of future consumption. A frequent explanation is the wastage of those savings: misallocated to useless projects or secretly consumed by a corrupt elite and/or oversized public bureaucracy. Such wastage for much of the 1950–90 period was reflected in (among others) the widespread negative value-added detected in high-saving Eastern European countries before their 'transition' (Hughes & Hare 1991) and the reliance, across the same period, of growth in East Asia (and the former Soviet Union) on expansion of inputs, rather than gains in their productivity (Krugman 1994).

At times, the US and some Western European economies seem to have gone through their own phases of 'wasted' investment, channeling it into a fashionable item whose price then 'bubbles'. The bubble rewards the early buyers but does not reflect any new production, so eventually bursts (ruining anyone who had borrowed to gamble on a further appreciation). However, it is not always fair to equate bubbles with unproductive investment. The 'rational' variety can be productive for the economy, even if ruinous for individual investors, if it tricks them into channelling funds to projects of lasting economic

value – such as building railways (Eatwell 2004) or prototype online retailers. Property-price bubbles can be indirectly productive if they enable new business to be financed by loans secured on the property. And property booms tend to occur in conditions of low saving because anticipated capital gains on house price increase take the place of actual abstention from consumption.

An equally likely reason why some countries' higher (genuine) saving rates do not convert into faster growth is that the savings are not applied to the domestic economy in any way. They instead flow abroad, sometimes into well-intentioned sovereign wealth investment, more often into private investments that finance growth in countries other than the savers' own. The scale of capital flight is difficult to gauge, even from countries with well-developed capital markets. Capital controls (maintained by some 'less developed' countries) make such measurement no easier, since the relevant outflow will either be staunched or concealed. But estimates of the *inflow* of capital to such known havens as Switzerland, the Cayman Islands and other UK overseas territories show them to be substantial, even in years when the source countries are not in political or economic crisis (Shaxson 2012, Zucman 2013).

Despite these obstacles, low-income countries' saving rates still correlate with their growth rates, according to the World Bank (2006) and a long succession of other studies. These tend to go further, showing econometrically that faster growth results from higher saving (rather than faster income growth generating higher saving, perhaps because people's consumption is slow to adjust upwards). Most of these countries appear to be making productive longer-term use of the resources they do not immediately consume. Higher saving is matched by investment which, as well as furnishing demand, can expand supply by raising the productivity of labour and other inputs to production. Whether this entails an increase in the stock or productivity of capital is less certain. And above a certain level of per-capita national income, the link between saving and growth appears to break down.

Producing without capital

It is conventionally assumed that economies increase in 'capital intensity' over time. In neoclassical theory, this is represented by

a rising capital–labour ratio. It results in rising labour productivity, which makes real-wage increases possible. Marxian theory represents it through the rising ‘organic composition of capital’, which again should permit increases in real wage; capitalists’ refusal to grant these may be one way in which the system falls into crisis, through under-consumption. If there is net investment, adding more to the capital stock than is subtracted by depreciation and obsolescence, then the capital stock must be rising. If it grows faster than the workforce, its ratio to that workforce must rise, unless the amount of ‘unproductive’ investment exceeds the amount of labour that is unemployed or unproductively employed.

Because the economy is assumed to become more capital-intensive over time, the same has tended to be assumed of firms within the economy. Indeed, the emergence of large firms has long been associated with the need for equipment which generate ‘economies of scale’, in a dual sense. Physically, an increase in the size of a plant or machine enables a more than proportionate rise in their output; financially, installing and maintaining such larger capacity entails fixed capital costs which decline per unit of output as this expands. Factory-based production, pioneered (in the West) in 19th-century Britain, appears manifestly more capital-intensive than the cottage industries it gradually supplanted. A modern steelworks or textile mill appears, in turn, more capital-intensive than its equivalents a century ago, as witnessed by its much smaller complement of ‘hands’ (and chargehands) and the sophisticated equipment that has replaced them.

Because such causal observations seem plausible, very little attention has been paid to the opposite possibility: that firms have the effect, and may have been set up with the intention, of economizing on capital. Although Adam Smith (1979 [1776]) floated the idea, few have sought to develop it. The long-established Habakkuk thesis, ascribing the superior productivity performance of US over UK firms from the mid-19th century to their faster adoption of labour-saving technology, sits uneasily alongside any suggestion of firms as also saving capital. Simultaneously economizing on both factors is possible, but the neoclassical linkage of rising labour productivity to a rising capital–labour ratio is more intuitively comfortable. Theories of ‘skill-biased technical change’ have widened the assumption from physical to human ‘capital intensity’, by arguing that new technology promotes substitution of skilled for less-skilled labour.

But even if (as Habakkuk argued) corporate America emerged at a time of relative labour scarcity, it is not clear that firms were then primarily designed to enable substitution of capital for labour, or that they still are. As the distinction becomes blurred, with the emergence of skilled workers and managers as sources of 'human capital', an alternative interpretation opens up. The firm is essentially a device for minimizing the costs of fixed capital. It does so by arranging equipment and other costly resources in space so as to maximize the scale, quality and continuity of output for a given input and by spreading out assets' financing cost through time to match the flow of revenue from selling products that they generate.

The firm can do this with all the types of capital that contribute to production – the intellectual, human, managerial and social varieties that add to value in the production and marketing process as well as the physical capital that traditionally underlies it. There are many ways in which a given selection of people and machines can be arranged in the workplace, with differing results in terms of productivity. The available ways are multiplied when national borders open and outsourcing to remote lower-cost locations become another option. Even in one particular arrangement of these 'inputs', output can be made to vary substantially, depending on the way the people are motivated and the machines are operated. The step changes in results sometimes experienced by sports teams that replace their head coach are echoed (with less publicity) across industry, when shifts in the line-up or mindset of managers and union leaders raise the performance of an otherwise unchanged unit.

This scope to change output by merely reconfiguring or remotivating inputs is inconvenient for the concept of a production function, whose precise association requires a numerical change in inputs to drive any change in outputs. But 'the firm' is nothing if not a space in which existing resources can be recombined for better effect, a message of Adam Smith that was sadly 'shunted aside and neglected because it has not fitted into the formal structure of either neoclassical or neo-Ricardian theory' (Leijonhufvud 1986: 203). This command space also enables managers to reconfigure with a view to economizing on inputs that are getting more expensive, and substituting those that are getting cheaper.

Because of their deployment of successive 'labour saving' innovations, it has long been assumed that firms typically raise worker productivity by substituting capital for labour. In Smith's pin factory,

the division of labour leaves the number of employees unchanged, but saves substantially on fixed capital, because each worker now requires just the tools for their specialist task and not the full set (Leijonhufvud 1986). Chandler (1977) shows how, a century later, the deepening division of labour around increasingly sophisticated product and process technology had created a rising demand for specialist managers who are able to coordinate operations and plan production on an increasingly large and international scale.

Employment in large corporations kept rising, in absolute terms and as a proportion of the total workforce, and it came to include a growing tranche of administrators and executives as well as workers directly engaged in making products or delivering saleable services. But this has generally been interpreted as confirming, not contradicting, the corporation's labour-saving character. It makes more people employable, on the shop floor and in the offices above, by raising their productivity. Profitability may be further raised by the exercise of monopoly power, with skilled management being needed to achieve the scale of operation that can dominate the market and put up prices. But as corporations survive the rise of anti-trust and other competition-preserving interventions, they must be adding to efficiency. The assumption is that by saving labour they make it cost-effective to employ more. A larger managerial tier is needed, but it pays for itself in terms of higher productivity compared to the mass of smaller owner-managed firms that would have had to persist if modern corporations did not appear.

Beyond the mid-20th century, however, the continued growth of corporate employment – increasingly concentrated in its managerial ranks – becomes harder to reconcile with the deployment of fixed capital to replace labour. Its rationalization as 'skill-biased technical change' is equally difficult because the shift is less from unskilled to skilled labour than from all production labour to staff who are solely involved in supervision, coordination and strategy. The substitution of managerial labour for production labour cannot lead to productivity growth through any technical process: it is now by a largely financial process that expanding management can deliver further unit-cost reductions.

The 'coordination' provided by specialist management delivers efficiency improvement partly enabling larger-scale operation and keeping increasingly complex operations coherent at a point in time.

Modern large-scale enterprise enables 'practices – coordinated by management – which spread debt service (opportunity cost of holding capital) over a larger flow volume of output . . . [yielding] savings associated with the more intensive utilization of inventories and fixed capital . . . modern business enterprise, considered as a new technology, should be considered a labor-using, capital-saving technique' (Field 1987: 476). But of equal importance, neglected until the arrival of modern financial theory, is the large corporation's ability to manage the financing of production, spreading the costs of debt service across time as well as across larger production volume.

Economizing on the 'fixed' capital of plant, machinery and technology is one way that firms can economize on the 'financial' capital needed to finance their investments. But financial market growth and innovation makes other ways available. And over time, financial capital becomes the more important strand to economize on – partly because innovations in process design and equipment production reduce the unit cost of fixed capital and partly because innovations in finance *raise* the cost of the firm's financial capital. This second point, paradoxical at a time when financial markets were viewed as growing because they delivered cheaper capital, will be explored more fully in the next chapter. Here, trends in enterprise structure and management over the past half century can be cited as evidence for its importance. The value of modern management lies in its ability to keep attracting investors, by keeping their rate of return above the opportunity cost of holding capital. Management's contribution to financial engineering eclipses that of production engineering, and the enterprise's 'labour intensity' starts to rise again in pursuit of lower 'capital intensity'.

Managing without capital

As well as reducing their fixed capital needs, firms fight a constant battle to keep down their working-capital requirements. Cash tied up in unprocessed materials or unsold output earns no investment return, except on rare occasions when the unsold stocks appreciate in resale price. Sale and physical storage of such stocks actually imposes a cost, raising the incentive to keep them to a minimum. The scope for firms to profit by pushing down inventory levels, through the way they manage themselves and their suppliers, has been amply

demonstrated by studies of 'lean' production beginning with the car industry (Womack et al. 1990). Companies in countries with the highest capital costs and storage costs tended to lead the way in achieving just-in-time delivery to the factory and showroom as well as the shortest possible time between raw components arriving for assembly and finished products driving off for final delivery.

Efficient movement of cash through business is the virtual companion to efficient flow of intermediate materials. So improvement of 'cash conversion efficiency' – signalled by a rising proportion of sales arriving faster on the balance sheet – is pursued alongside the reduction in material inflows. Collecting customers' payment sooner and leaving it to settle with suppliers later are relatively crude ways to increase cash-on-hand. They are more likely to redistribute cash (from firms forced to pay upfront to those that can demand supplier credit) than to free up more for the whole industry supply chain. But even if maximizing cash holdings and minimizing physical stock-holdings is a zero-sum game, firms are set up as competitive units designed to win it.

The cash-generation ideal, established by supermarket retailers many years ago, is to buy on credit and sell for cash, thereby tying up no money. Comparable saving was achieved on physical inventory costs by leaving goods in suppliers' warehouses until a few hours before they were needed and (as sales moved online) shipping them straight to the customer without an intermediate stay on the showroom floor. Manufacturers responded with a similar war on inventory, typified by the 'Dell model' in which production of a unit only starts when the customer has specified its configuration and paid for it.

Conclusion

Non-financial firms can rarely match their banks in using leverage to economize on capital. For this reason, they cannot rely on being 'too big to fail' and must find other ways to minimize their need for it. The recent direction of the multinational business world – increasing management concentration in headquarter countries, with operations spun out to lower cost locations – is conventionally ascribed to the need to stay profitable by saving labour. A desire to save on costs of capital – fixed and working – turns out to fit the recent pattern equally well. But it raises the question of why capital saving has become such a corporate priority.

One plausible development is that innovation has moved in the direction of 'light' industry and services whose fixed (and working) capital requirements are much lower than in when 'heavy' industry dominated national output. But the direction of such innovation may not be exogenous – it is shaped by the preferences of producers and their customers, and a lowering of capital's unit costs should encourage its use, not encourage economization. A further explanation seems to lie in the costs of financing production, determined by capital markets with which firms must now compete as well as cooperate. To understand what has happened there, attention needs to turn to 'capital markets' and the way they price the supply of new industrial capital as well as value the stock of capital already in place.

4

What Isn't There? Capital Definitions and Measurements

Macroeconomic theory suggests the world continually accumulates capital, making it liable to an excess. Microeconomic observation finds firms, banks and governments doing all they can to economize on capital. The inconsistency is most likely to reflect differences in the definition of capital, some of which were already visible in the first three chapters. There, capital was variously treated as physical means of production, sums of money used to finance the operation of means of production, personal wealth (perhaps built up through flows of personal saving), or the stock that accumulates from flows of net investment. Capital flows as sums of money, but its stock more usually takes the form of physical resources or entitlements with monetary value. The studies reviewed in Chapter 1 suggest an excess flow which might coexist with shortage of stocks, while those of Chapter 2 point to excess stocks despite deficiency of flows.

These definitional differences enable simultaneous surplus and scarcity of capital to be explained through its being channelled into disconnected pools. Observation of banks and financial markets led long ago to the idea of a 'financial circulation' which limits entrepreneurs' access to capital, restricting its flow to the 'real' or industrial circulation. Once it enters the financial circuit, where it is used to pay for assets or kept in a liquid reserve in anticipation of asset-buying opportunities, money becomes 'capital' because it is not being used to buy currently produced goods and services – yet is inaccessible to the capitalists producing these. Capital may then be observed to be increasing in total, yet remaining scarce at particular locations.

The idea of separate financial and 'real' circulations of capital within economies has recently been complemented by that of barriers *between* economies, with capital generated in some countries flowing to others, and so becoming unavailable for domestic use. Although the removal of barriers to international capital flow has partly predicated on the idea that this would allow its reallocation to places of scarcity, promoting more even development, 'perverse' capital flows from places of scarcity to places of abundance have long been the norm. Financial capital flows from high-saving low-income countries to low-saving high-income countries, even though these are supposedly far richer in productive capital (in all except perhaps its 'natural' forest and mineral form). Multinational manufacturing investment continues to flow to lower-income from higher-income countries, long after these have 'deindustrialised' to the extent of being only the world's organizers and financiers of production, with China its workshop.

Both developments might make saving on capital at the enterprise level consistent with the continuous build-up of capital at the system level. Or, conversely, they might allow accumulation of capital by individuals and enterprises while system-level capital becomes increasingly scarce. But any further exploration of why capital disappears, or where it disappears to, requires a clearer definition of what it is.

Capital as financing ahead of production

Capital was initially defined as the money needed to finance production, by meeting the cost of raw materials, wages and other inputs that needed to be met in advance of any saleable output (Hodgson 2014). This could take the form of actual sums raised, through the entrepreneur's previous saving or issuance of shares. Or it could consist of loans – from suppliers (not taking payment until output has been sold), from an intermediary lender (such as a bank) or even from customers (making payment in advance). This tends now to be called 'working capital', to distinguish it from the other types posited since.

With industrialization, the definition was extended to cover machinery and other produced items which enable production without being used up in the course of it. These 'fixed' capital items

are comparable to working capital in that they require financing upfront: to buy them or rent them from other owners and to service or repair them after previous production rounds. Like raw materials and labour, they are commodities that have to be bought before the arrival of an output whose sale can cover the costs of production. The only difference, in conventional views of the production process, is one of longevity. Fixed capital may have been bought some time before the current production and may remain at the end to be reused in future rounds of production. This enables its financing to be spread across its lifetime, perhaps through a loan or leasing agreement. During each production process, expenditure on fixed capital will be equivalent to the cost of maintaining and running specifically for that process, so it is functionally equivalent to working capital.

Capital as means of production

So far, capital has been defined entirely as sums of money – those needed to assemble the materials, labour services and machinery that can produce an output intended for later sale. In effect the concept of working capital has been extended, to cover current payments required to keep capital goods updated and operational, as well as fed with raw materials and labour services. However, the arrival of machinery leads to another, non-monetary, concept of capital. This is the actual *value* of the capital stock at the time that it is deployed in production. Whereas the value of working capital is just a sum of current monetary expenditures, valuation of fixed capital requires the reckoning of heterogeneous physical (or intangible) objects into monetary flows. Because they occur through time, adding the expenditures that have gone into fixed capital or the income streams expected to flow out of it does not provide an unproblematic valuation method.

Once it is conceived as a long-lasting stock, however, the definition of capital inexorably broadens. Anything that generates or facilitates production, without being fully used up in the production process, can be classified as capital. It ceases to be just a sum of money and can also take physical form – analogous to a catalyst in a chemical reaction, which can speed up the process without being used up in the process. With this extension from a money sum (which may be a

stock or a flow) to a non-monetary item (characterized only by durability and reappearance), the category has quickly expanded. It can now include anything which produces (or helps to produce) a flow of output and income over time. This extension takes in (among others) natural, intellectual, social, organizational and human capital. Capital can now be a commodity that produces other commodities (whose sale brings future income) as well as a money sum that finances this process.

Capital as entitlements to income from means of production

The extended definition also allows inclusion of sums of money which generate a flow of income, even when these do not directly enter a production process. Such 'financial capital' takes the form of share- and bond-holdings (and securitizations of other debts) bought on secondary financial markets, having been resold by those who bought them on first issue. These financial instruments are 'capital assets' from the viewpoint of the buyer, who can expect a flow of interest or dividend payments, and perhaps an eventual lump sum when the loan is redeemed or the share repurchased. But the money they pay when buying the instrument does not go to finance the production from which payments on the instrument (and eventual redemption) will be made.

Shares and bonds – 'securities' – represent entitlements to the income from capital. When first issued, they may directly contribute to the financing of fixed and working capital. When subsequently retraded, they reassign that portion of the income from this 'productive' capital that is channelled to investors as dividends or interest. The opportunity to resell these instruments, especially in a liquid and regulated secondary market, makes portfolio investors more willing to buy them and so helps to bring down the cost of new share and bond issues. Retradability can, in principle, square the firm's desire to raise long-term funding from a stable, patient investor base with investors' desire for a flexible commitment, allowing portfolios to be shuffled or liquidated at will. The funds stay with the firm, while entitlement to the payback on the funds can be passed (at low transaction cost) between investors or from those entering the stock market to those who want to exit.

Capital, credit and time

In its modern definition, therefore, capital consists of *assets* – items or instruments that are expected to yield a flow of income or output over time. Typical assets include a wholly owned firm, equity (shares) in a firm, a loan agreement and a building that can be hired out. Assets may generate money income directly (by periodic contractual payments) or indirectly (by flows of output that can be sold for money or replace purchases that would otherwise be needed). Most assets can also generate income through sale – for a lump sum or series of instalments, conventionally assumed equivalent to the discounted present value of future income that the purchaser can expect.

There is an element of uncertainty over all these income sources. Those contracted to pay may fail to do so; future output may not materialize or may prove worthless; the resale price of the asset may fall, even to zero. So asset prices are subject to shifts in expectation and confidence – about specific technologies, firms and industries and about the economy and society in general. Individual expectations can be influenced by what others expect, or appear to expect. So a 'market' expectation can be self-fulfilling (as when buyers pile in while sellers withdraw on the expectation of a price rise) or self-denying (as when many holders of an appreciated asset decide to sell it, thinking they can realize their capital gains).

Assets are conventionally distinguished from *durables*, which are consumer products that deliver their benefits over time. The distinction has never been clear-cut, however, and often seems to relate more to who buys the item (and how it is used) than what exactly it is. In many cases, durables yield a stream of outputs in kind that cannot be converted readily into cash (car journeys, machine washes, toast), while assets yield a stream of money income or readily saleable outputs. But some items treated as assets (notably houses) may only ever yield an 'implicit rent', comparable to that of family cars or washing machines which are treated only as durables. The division becomes clearer when items are considered in terms of how they are grouped rather than how they operate individually. A durable can be reclassified an asset when it is part of a money-making enterprise, such as a financial institution or non-financial company. So a vehicle or 'domestic' appliance becomes capital equipment when bought and deployed by a firm or when the family that owns it sets itself up as a business.

Reflecting the sometimes arbitrary boundary between them, assets and durables have this in common: because they deliver a flow of income or saleable output (or implicit income) over time, their purchase can be staged over time. Investment is just protracted consumption, whose disbursement and financing can also be protracted. Investment is distinguished from consumption by the duration of a product's benefits and the resale possibility that arises from the user not getting all their benefits at once. This is confirmed by the many goods and services that are difficult to place on the spectrum. A computer is ostensibly an investment, but if obsolescence or changing user needs lead to its being scrapped after a year or two, its accounting treatment will be little different from a current expenditure that never appears on the balance sheet. The decision to treat household purchases of washing machines and cars as consumption and houses as investment could be traced to houses' generally greater durability and (consequent) prospect of capital appreciation, but is more one of convention than of underlying reason.

Whereas savers are (by definition) refraining from purchase, investors still buy something. They are distinguished from consumers by buying something that can be treated as an asset. It will yield its gratification (income, and/or benefits in kind) over time, not all at once. Because of this, it can usually be resold, at a price determined by the anticipated income that has still not flowed from it. This resale does not usually recover the real purchase price of the asset, because it will already have yielded some of its income and (if a physical asset) have undergone depreciation (unless the owner has carried out maintenance and updating to offset this). However, because assets are valued on the basis of expectations and risk assessments that can change, it is possible that a part-used asset can be resold at or above its original purchase price.

Capital as contracts on entitlements to income from production

Capital markets also promote the creation and trading of derivatives, which are contracts on entitlements to the income from capital. The simplest varieties include futures contracts, tradable obligations to make or take delivery of a specified amount (of a standardized commodity or security) at specified future prices and dates, and options,

which are futures contracts that need not be exercised if present market prices are more favourable on the expiry date.

A futures contract is superficially little different from a loan to finance working or fixed capital. Both involve an advance of money, ahead of the delivery of a product, which could be used to finance the presale creation of the product. But the money 'invested' in a futures contract rarely enters the production of the item whose purchase or sale is specified in the contract. It resembles a bet placed on the outcome of production activity, rather than an actual participation in that activity. The comparison with bets comes even closer with other financial innovations that emerged in conjunction with more familiar derivatives and mirrored their rapid growth. These include contracts-for-difference, under which a buyer and seller agree to give or receive payment depending on whether the price at a future date is below or above a reference price specified in the contract; credit default swaps, which pay out in the event of a default on a specified debt issue; and catastrophe bonds, which insurers repay with interest only if a specified disaster does not occur. Gambling becomes explicit with the placing of bets or spread bets on future price movements – a practice which can also avoid the taxes and margin requirements that would be incurred in actually buying or short-selling the specified asset but whose popularity with financial investors has led to financial regulators (rather than gambling regulators) taking overall responsibility for it.

Consistently with this speculative aspect, the volume of futures (and options) contracts written against an item to be delivered in future is not limited by the volume of that item that will be available for delivery. Just over 2.5 billion tonnes of cereal were grown globally in 2014, according to the US Food and Agriculture Organization (FAO 2014), but there was nothing to limit the total specified in cereal futures contracts to 2.5 billion tonnes. Extending the analogy with bets on a sports event, the sum committed by speculators can (and does) greatly exceed the prize money given to contestants. The limits to the scale of capital committed to derivatives trade are set by traders' reserves and creditworthiness (deciding the extent to which they can leverage their positions), and creditors' capacity to lend to them.

Buying and trading derivative contracts can be safer than buying the underlying assets, because it allows investors to go 'short' on assets that are expected to depreciate in price (as well as 'long' on those they

expect to appreciate) and so widens the opportunities for hedging. Any problem of derivatives trading imposing higher transaction costs than 'spot' trading diminishes as the scale of trading rises and counterparties start to compete over the writing of contracts. Buying and trading derivatives 'on margin' has the further advantage of reducing the capital that must be committed upfront and 'tied up' in any transaction. If an asset can be bought on credit and resold before the loan falls due (or short-sold and repurchased before the loan of the asset falls due), profit can be made without any capital commitment. Such trading usually confines the trader to a short time-horizon, the aim being to make a capital gain before the next loan repayment or margin call. Trading through bets on the movement of an asset price may have the further advantage, over actual investments in the asset, that it avoids taxation on the purchase of the underlying asset and/or the profits on reselling it.

In principle most derivatives should not count as a form of wealth in aggregate because the assets they create for one party to the contract are offset by liabilities for another. After the event, bets merely redistribute wealth from losers to winners and make no net addition to the stock of wealth. A year before the 2008 financial crash, the notional value of all outstanding over-the-counter derivatives was slightly less than US\$600,000 billion, when the market value of the underlying assets (mainly equity, bonds and bank deposits) totalled slightly less than US\$170,000 billion. But the market value, if all contracts had to be settled immediately, was US\$14,500 billion; this dropped to little more than US\$3,000 billion when offsetting contracts were netted out (Leibenluft 2008). This is still a significant excess of contractual value over what would have been attainable if all contracts were settled – but hardly a new one, when futures markets are unrestrained. 'It was estimated that in 1888, futures contracts for 25 quadrillion (25,000,000,000,000,000) bushels of wheat changed hands in the United States – even though American farmers harvested only 415 million bushels of wheat that year' (Stout 2011: 16).

The tradability condition

Economists have often used the resaleability condition to exclude 'human capital' – the skills, knowledge and experience possessed

by people which enable them to generate 'professional' output and income, unavailable to people without them. Unless people can be bought and sold, there is no market for the human capital items – only for the flow of services that human capital generates.

However, if status as capital requires resaleability, it is unclear why the restriction should apply only to people. There are disembodied capital items (including bank loans, specialist machine tools and cathedrals) which also have no resale market, and can still be assigned some sort of market valuation in its absence. Many items of 'natural' capital, such as national parks and the trees and minerals they contain, are also legally prohibited from sale. The decision to exclude human capital appears to be based more on modern labour-rights protections, which restrict employers to hiring it rather than owning and retrading it outright. This has advantages of flexibility when labour requirements fall but is disadvantageous when needed staff can be 'poached' with only a brief contractual lock-in. The firm serves in part as a device for retaining non-purchasable labour, by creating connections with other employees and with physical and intellectual capital which can improve pay and productivity as well as giving non-financial rewards. When it is impossible to buy individuals, or contractual entitlements to an individual's product, securities issued by a firm that employs them are the closest approach to tradable human capital.

Is capital still needed?

If capital is merely a sum of money needed upfront to finance production, its disappearance would seem to be consistent with normal 'capitalist' development. Those supplying goods or labour services to the entrepreneur initially ask for money upfront because they cannot wait for reimbursement after the product has been sold (or cannot be sure that profitable sale will ever occur). Money, as the IOU from an uncompleted transaction, ensures an immediate reward of generalized purchasing power. With the development of banking, insurance and capital markets, pre-production transactions could in principle be conducted entirely on credit. Presale expenses could be met by banks – lending to the entrepreneur or to his/her employees and suppliers so that they can postpone payment demands until the company has something to sell. Creditors concerned about default could

buy insurance against it, in addition to diversifying their risks across a range of pre-production borrowers.

Capital can be raised by the entrepreneur's own savings, by drawing on other people's savings and/or by borrowing. Other people's savings can be accessed directly by selling shares and bonds or indirectly by borrowing from a bank. Until banks and bond markets became widely accessible, enterprises had to raise most of their capital by drawing on their own (and immediate friends' and family's) savings or by issuing shares. This proved increasingly inefficient, and obstructive to long-term investment plans, as the people with money that could be made available as capital became more socially and geographically distant from the people with good ideas on how to use it.

The 19th-century engineering pioneers Marc and Isambard (Kingdom) Brunel typify the tribulations of entrepreneurs before financial markets develop. Their grand designs to conquer distance with railway and steamboat connections, and to tunnel and bridge the landscape in support of such links, were continually thwarted by lack of finance and the elaborate diversions needed to extract it. Earlier entrepreneurs had often enjoyed modest start-up funding needs, easily met by their own and a few friends' or partners' subscriptions, and repayable after a reasonably short period as sales or service payments started to flow. But railway and seaway infrastructure required investment well beyond what small circles could raise, on which returns might not materialize for years. Many groundbreaking projects appeared doomed by the unbridgeable gap between high finance and grand design.

The younger Brunel had to break off from project management and design to cajole his creditors and entertain impatient shareholders, scrapping a number of plans because the funding dried up before hope of completion. His personal journal, intended as a reflection on engineering achievement and the finer lifestyle that flows from it, conveys the continual distraction wrought by 'the dam'd directors who can't swallow when the food is put into their mouth'. 'Here are these directors damning the [Thames] Tunnel as fast as they well can. If they go on at this rate we must certainly stop, and then, by jove, we shall stop – payment – where the devil money is to come from in that case I know not,' he confides on 7 May 1828, bemoaning the greater ease with which one rival had built the London Docks having

'established a connection which ensures his fortune', and another would complete London Bridge using 'such a connection with government as to defy competition' (Brunel 1828).

The tribulations of the Brunels, struggling to entice shareholders into their grand engineering projects (and winning over creditors only by promising a large chunk of equity if things went wrong) gave way in the 20th century to a clearer division of labour between corporate management and finance. Entrepreneurs still sweated, but over the 'real' business of taking deliveries from suppliers and making them to customers rather than the structuring and sequencing of the firm's finance. The Channel Tunnel, retail giant Amazon and London's Canary Wharf tower fought their way to fruition by extending credit lines, long after shareholders had lost their faith. For the individual enterprise, attracting credit can be as big a struggle as appeasing shareholders, but recent history shows that lenders are more inclined to make additional advances in the hope of redeeming those that went before. From a whole-economy perspective, credit offers financing without the need to assemble and tie up existing funds, with banks creating whatever new sums a worthwhile investment requires (Palley 2001).

An economy built on debt is not inherently problematic, provided borrowers invest their proceeds in an 'asset' intended to generate income, and most get their calculations right. Minsky famously identified, as relatively safe, 'Hedge-financing units and their bankers [who] expect the cash flow from operating capital assets (or from owning financial contracts) to be more than sufficient to meet contractual payment commitments now and in the future' (1986: 206–7). These could create a systemic problem only if their expectations were over-optimistic all round, as sometimes happens when a new technology (such as railways or online retailing) is in its early stages and attracting many simultaneous start-ups.

A credit-based economy only becomes inherently dangerous with the arrival of 'speculative' investors (and supporting bankers), who borrow to buy assets whose expected income covers only the interest payments on the debt, leaving the debt itself to be repaid from later asset appreciation (or continually rolled over in the absence of this). The danger becomes extreme with the arrival of 'Ponzi' investors, who borrow for projects with no obvious source of cash

flows, relying (at least for a period) on running up new debt to service existing debt. Speculative and Ponzi investors are vulnerable whenever they come round to refinancing their position, because unavailability of affordable new credit will force them to default on existing loans. Minsky traced the vulnerability of modern economies to the tendency of sustained booms to encourage increased speculative and Ponzi investment as well as to overhype the expectations of hedged investors.

Efforts to unravel the banks' tortuous lending trail since 2008 suggest that the world had far more debt – and correspondingly less equity – than most had dared to imagine. But although extreme in its extent, the credit crisis that broke in 2008 was not atypical in occurrence. 'Credit boom and bust cycles . . . recurrently derailed economies every decade or two from the beginnings of modern finance capitalism circa 1800 up until the epic collapse and recalibration of the world economy after the 1930s' (Taylor 2012: 4). This cycle of disruptive credit growth ending in bank collapses and disruptive credit contraction was undeterred by periodic enforcement of a gold standard, which supposedly constrained banks' lending to what could be 'backed' by core reserves. The only prolonged period free of financial crises is the brief 'Bretton Woods' interlude of 1945–70, when a gold-exchange standard was supported by a countercyclical policy at the national level, which was made possible by curbs on cross-border capital flow.

Given the extent of 'financial repression' in this post-war period – which also included a ban on derivatives, fixed exchange rates to deter currency speculation, strict separation of commercial from investment banking in the US and strong commercial-bank regulation elsewhere – the mystery is less the absence of credit-driven booms under Bretton Woods than the avoidance of prolonged stagnation and slump. 'How was it that the advanced economies could enjoy *Les Trente Glorieuses* up to 1975 despite having such small, repressed and uninnovative financial systems, as compared to the era since?' (Taylor 2012: 5). The answer may be that Western governments, desperate to rebuild capitalism, created a framework that forced businesses and economies to operate with capital. When controls on capital were weakened, those who owned it (and those who had to pay for it) could again indulge their desire to operate without it.

But what exactly is 'it'? The question has been postponed too long.

Measuring capital

Summing up the past

Accountants conventionally determine the capital stock through the perpetual inventory method (PIM). This calculates the value of capital today as the sum of past investment expenditures. These are adjusted for inflation using an appropriate index of capital-goods prices and netted for depreciation. The capital stock (K) is continually expanded by flows of investment (I) and eroded by depreciation (d). So the capital stock in time t is

$$K_t = K_{t-1} + I - d(K_{t-1})$$

where K_{t-1} is the capital stock in the previous period and d the rate of depreciation.

This generates a series which, when summed, relates K_t to the capital stock at the start of the period n years ago, where n is the maximum lifetime of the type of fixed capital in question. With present stocks entirely traced back to past flows, the PIM derives the value of capital from past expenditures and price movements and avoids any use of a 'discount rate' which might raise awkward questions as to how this is determined.

The operational lifetime n and depreciation rate d can be adapted for different categories of capital goods, which wear down or become obsolete at different rates. Higher rates of technical change will tend to raise d and reduce n , leading to a bigger gap between gross and net investment and a higher annual investment requirement for maintaining the capital stock. This is true even when (as pointed out by Salter and Brenner) some obsolete capital equipment is retained until its current running costs exceed its current output. Faster technical change accelerates the reduction in product prices and the retirement of marginal equipment that no longer covers its costs.

A number of critics, notably Scott (1989), argue that the PIM will underestimate the aggregate capital stock, because the appropriate measure should use *gross* investment flows and ignore depreciation. Their basic argument is that depreciation redistributes the income generated by the capital stock (from capital to labour), rather than diminishing that income. Items of fixed capital do become less productive (and lose value) over time, but this is due to technical change

and obsolescence. Since these are propelled by gross investment, this is the appropriate expenditure flow for aggregation, at least when the resultant capital measure is to be used for explaining economic growth.

The PIM applied to gross investment is likely to overestimate the capital stock, however, because it assumes that investment is at all times channelled into the most productive use. Depreciation (d) will then be the only factor eroding the output from this new investment. There will be no further subtraction due to the new equipment being inappropriately chosen, or inefficiently operated, or not materializing at all because the money was siphoned off by corruption in the approval of management process. A long line of empirical research, focused on the US, suggests that conventional measurements have consistently overestimated the capital stock – especially at times of rapid technical change – by underplaying the rate of obsolescence. Delays in scrapping, for reasons identified by Salter (1960) and Brenner (1998), keep the visible (operational) capital stock significantly larger than the *effective* stock. The PIM is liable to exaggerating net investment because of inadequate data on scrapping and insufficient recognition that the pace of scrapping is likely to rise with the level of investment, which drives obsolescence (Miller 1983).

Baily (1981) adduced low (below 1) valuation ratios and Tobin's q ratios as evidence of redundant capacity in PIM-measured capital, revealed by market perceptions. The valuation ratio is the ratio of market valuation of firms' assets to their real valuation or book value, and q is the closely related ratio of firms' market value to the replacement value of their tangible assets. Both were well below 1 for most of the period from the late 1960s to the early 1980s, suggesting a proportion of obsolete equipment in the capital stock which financial markets detected while corporate and national accountants did not.

Pursuing the same issue, Peter Bernstein (1983) noted that the US economy had since 1973 hit full-capacity working (inferred from accelerating inflation) at successively higher capital–output ratios. This implied that progressively more capital was needed to achieve a given production increase, due to declining efficiency. According to the official data, investment was adding more to the capital stock than to output. This could have been due to misallocation and/or obsolescence, for which the investments itself may have been partly responsible, by embodying innovations. Bernstein offers the alternative explanation that official data were overstating the value of the

capital stock. As evidence he cites the sharp drop in managers' dividend declarations after 1969, which can be interpreted as acknowledgement of a sharp drop in the value of their assets which the standard capital measure does not pick up.

The past is an inadequate guide to the present, as these various PIM critiques highlight. Different assumptions about rates of depreciation and lengths of operational lives, and about the efficiency with which past investment spending is allocated and used, can yield very different estimates of capital's value and productive capacity today.

Discounting the future

To avoid inappropriate assumptions about the efficiency with which past investment is used and the rate at which it depreciates, the present capital stock can be calculated as the sum of future net revenues it is expected to generate, reduced to present value with an appropriate discount rate (d).

$$K_t = R_t + R_{t+1}/(1+d) + R_{t+2}/(1+d)^2 + \dots + R_{t+n}/(1+d)^n$$

With a constant annual R , as in the case of an annuity, this summation reduces to $K = R(1/d)[1 - (1/(1+d))^n]$. With a constant growth rate (g) of R , it becomes $K = R/(d - g)$, as in the 'dividend discount model' for valuing a share with a predicted rate (g) of future dividend growth.

Aside from the difficulty of predicting future net revenues, this forward-looking approach has been challenged over the appropriate choice of discount rate. For revenues from capital, the relevant rate appears to be the rate of return on capital, or the rate of interest (the opportunity cost if capital is invested instead of saved). But these are rates of return whose calculation uses the value of capital (K_t) in the denominator, which cannot therefore be used as discount rates for getting to K_t . But economists traditionally assumed the rate of interest to be determined by the marginal product of capital. As the value of capital must be known before the interest rate is determined, it cannot be calculated using that interest rate. The use of an interest rate determined in financial markets to discount (to present value) future revenues from a physical capital stock, which are determined in product markets, will lead to valuations that violate conventional economic assumptions. There will not be any tendency for 'capital intensity' (the ratio of capital to labour) to increase as the interest

rate falls, and the same 'capital intensity' of production might be observed at different interest rates, with higher or lower intensities in between. The value of a capital stock changes whenever the interest rate changes (sometimes called the 'price Wicksell effect', after the Swedish economist Knut Wicksell [1851–1926]). The problem of interest rate determination being 'logically prior' to capital valuation was only fully resolved by the theory of 'general equilibrium', in which the aggregate quantity of capital deployed and its interest rate were determined simultaneously.

'Capitalization' of future income seems the obvious approach to valuing financial instruments, which are claims on the future income expected to flow from the firm or capital stock on which those instruments are issued. 'Bonds, corporate shares, preferred stocks, mortgages, bank accounts, personal loans, or the registered ownership of an apartment block are simply different incarnations of the same thing: they are all income-generating entities. As such, their price is nothing but the present value of the earnings they are expected to generate' (Nitzan & Bichler 2009: 156). People who trade such assets, or items of capital equipment, might attempt to make such calculations when taking the decisions that lead to the setting of their market price, but efficient-markets ideas deny that this is necessary for market prices to move into line with expected present values. When markets are competitive and well-enough informed, traders who systematically misjudge future earnings will lose ground to those with more accurate predictions, until the survivors behave as if correct discounting to present value has been done.

The growing number who seek to build macroeconomic models from 'rational choice' microfoundations have tended to argue that all assets, physical as well as financial, should be assigned their net present value – perhaps because it is the valuation method that occurs naturally to the economist at the screen, as distinct from the person in the street. Accountants have tended to resist the general use of capitalization for much the same reason. The approach requires speculative assessments of future revenues and appropriate discount rates, is difficult to apply to variable streams of future revenue, and is often not used by firms or households when trading assets (Bos 1995: 21–3). So corporate and national accounts still tend to assign assets their present market value, acknowledging that this might differ from a neutral assessment of their net present value.

A further justification for using market values has traditionally been that firms' and households' spending is constrained by their income, the relevant measure of which is what money they can raise in a given period without eroding their wealth. This excludes from income any 'capital gains' caused by the favourable reassessment of their assets' net present value. But as incomes rise and financial markets are liberalized, there tends to be more observation of 'wealth effects' under which on-paper capital gains promote additional expenditure in the marketplace.

The Hicks/Haig/Simons definition of income, as the maximum that could be consumed without affecting net wealth, offers a potential escape from the macroeconomic instability depicted by Clower (1965), in which aggregate demand can spiral downwards when agents must make a current sale (of products or labour services) before they can buy. Circular flows of income might be less volatile if income is widened to include capital gains, since there might be an offsetting rise in these if the drop in current demand pushes prices and interest rates down. But recent experience suggests the opposite. Whether arrived at by current market valuation or net present valuation, asset values tend to vary procyclically, so that wealth effects will intensify fluctuations in spending caused by rises and falls in current income. Sticking with present market values insulates national accounts from misleading increases in output and income when rising confidence is raising assets' net present valuation, at the cost of unexpectedly deep contractions when confidence and asset values fall.

Evaluating the present

The price for which an asset could be sold is often the most accessible way to gauge its value, and its use has expanded as asset markets become more numerous and better traded. Enthusiasts for this method suggest that a census of capital assets, using observed market prices to determine their present worth, is the most satisfactory approach. Constructing capital's current value indirectly, from past investment flows, was a more primitive approach made necessary when such surveys were made less frequently, leaving investment spending as the only high-frequency data. 'Balance sheets are constructed by national statistical institutes and central banks using a large number of census-like sources, in particular reports from financial and non-financial corporations about their balance sheet and

off-balance sheet positions. The perpetual inventory method usually plays a secondary role' (Piketty & Zucman 2013a: 11).

The move in national-income accounting to valuing aggregate capital directly, and away from calculating its stock as a sum of past net flows, is consonant with a shift towards the balance sheet in corporate accounting, promoted by economists and now adopted by international standards-setters. Dichev (2008: 456) summarizes the new outlook, radiating worldwide from the US Financial Accounting Standards Board (FASB): 'Earnings is a "change in value" concept, and it is impossible to define a change in value concept before one defined "value". Thus, the determination of assets and liabilities logically precedes and supersedes the determination of earnings, which implies that the balance sheet approach is the natural basis for accounting.' Along the way, the Hicks/Haig/Simons definition of income and earnings – maximum expenditure permitted by unchanging wealth – replaces the income traditionally used in national accounts, which excludes capital gains and losses. And saving (or dissaving) becomes an inference from the rise (or fall) of net worth, rather than income minus expenditure as traditionally defined.

The objection that many assets have no market, or a very thinly traded one, has been largely overcome by their assembly into 'financial' assets that have large and liquid secondary markets. With much of the capital stock (including its human, intellectual and organizational varieties) contained inside large publicly listed companies, an alternative measure of its value is the price of the equities issued against that stock. Companies' market valuations can be easily determined as their shares' price multiplied by the number in issue. A simple sum of these gives total market valuation.

While there is scepticism on whether the present sale prices of non-financial assets represents a considered and appropriately discounted view of their future earnings, economists have held out longer in defence of such a view of financial markets. The 'efficiency' of equity markets (at least those in large financial centres) continues to be argued, despite demonstrations of excess volatility (e.g. Shiller 1981, 2005) and the persistent success of some chartists and value investors. Similar efficiency has been ascribed to futures markets since their post-1973 expansion and refinement of option-pricing formulae. The share price is assumed to give a present valuation of future distributed income flows, whether or not every market participant consciously

makes this calculation. If they do not, it might still be argued that they act *as if* they do, since inefficient traders will be forced to imitate those get the calculation right (or will be competed out of the market if they do not). If they do the calculation with a wide margin of error, the market can still deliver an 'average' valuation that gets closer to the truth than any one expert is likely to do (Surowiecki 2004).

It could be objected that equity markets are valuing the whole of a company, not just the capital it deploys. But this is more confirmation than a rejection of the market-valuation approach, once capital is defined more broadly as sums of money or other resources that generate future streams of income. Most forms of capital that could be free-standing have now been brought within firms, and some – including the 'social capital' that supports trading relationships and the 'organizational capital' that coordinates other exchanges – might not exist outside them.

Firms assemble physical, human and knowledge assets that individually depreciate in value and manage them so that the collection maintains or even gains value. With adequate management, they can achieve not only synergy (signalled by a market value that exceeds the replacement cost of tangible assets) but also longevity, replacing outworn or outmoded equipment (and labour) and thus maintaining or enhancing profitability. Company managers are often measured by their ability to 'add value', gauged by the stock price or the value of takeover offers received. Professional investors survive, in large part, by identifying (and holding) the shares of firms that subsequently rise in value. The firm offers them an investment that resists depreciation, and can even deliver appreciation – a role previously fulfilled mainly by real estate, gold and other precious metals, jewellery and less abundant commodities.

In the quest for theories based on cost-minimization, the importance of the firm's unique offer to investors has often been underplayed. It provides an organizational and legal structure that, by enclosing individual capital assets, offsets or even reverses their tendency to depreciation and obsolescence. Spatially, the firm deploys and coordinates these assets to deliver synergies which would not be obtained if each asset had a separate owner, trading via markets. This is the basis of 'transaction cost' explanations for the firm, pioneered by Coase (1937) and Williamson (1975). Temporally, it maintains and replaces these assets so that their productive capacity is maintained

and profits continue to flow while the sources of those profits keep turning over. The firm continually scraps old machines, winds up finished projects, leaves superseded buildings and replaces staff who change jobs or retire. Financial exposure to the firm (via equity or debt) gives the prospect of a long-term return, in contrast to direct exposure to any of these short-lived constituent parts. The transition from physical and financial capital encompassed by firms to entitlements issued by those firms is therefore recognized as a decisive one, in theories of finance and of the corporation.

In issuing debt, the firm represents a primitive form of securitization. It bundles together a diverse range of income-generating assets – machinery, commercial buildings, employees and managers, intellectual property – and issues bonds against it. The bonds are tradable, despite the firm-specificity of the assets they were secured against. Maturities on these bonds can also be longer term than most of the firm's physical assets (which wear out or become obsolete) and human assets (which leave, retire or otherwise get replaced). The parallel with debt securitization complements the long-established depiction of the equity-issuing firm as a form of derivative. The leveraged firm becomes a primitive form of call option. Shareholders in effect sell the firm to bondholders for a specified period, with an option to buy it back when the bonds expired. Interest payments were the option premium. Shareholders exercise the option, paying back the creditors and retaining control of the firm, if it is still solvent when the bonds mature. If not, they abandon the option and they consign the firm to its creditors.

Because financial operations made little direct contribution to non-financial firms' profits in the early 20th century, and because financial structure was rarely studied in detail before the 1950s, early 'theories of the firm' favoured internal technical relations over external financial relations. Smith (1979 [1776]) characterized firms as enshrining the division of labour, raising members' productivity by refining skills and reducing switching costs. The insufficiency of this explanation, because division of labour could also be effected among freely trading individuals, led to theories as to why some production arrangements gain efficiency within the boundaries of a firm. Coase (1937) ascribed the formation of firms to their ability to reduce transaction costs under certain circumstances, launching a reconceptualization of the economy as spatially divided between markets

and organizational structures that trade through them (and thereby dethroning the pursuit of price-setting power as the main motive for creating large firms).

For accountants, marking to market (MtM) has long seemed a way to avoid the potential deceptions of valuing assets by their historic cost as well as the speculations of deducing them from expected future revenues. MtM can capture the devaluations that occur when interest rates rise and the revaluations when they fall. It avoids the distraction of what was paid for an asset historically (which may be a misleading 'anchor' for present expectation) and of past expectations and risk assessments, which may have been superseded. Without MtM, a firm whose products have been made obsolete by innovation or a bank whose borrowers are defaulting can appear deceptively solvent, which may delay the restructuring and reallocation of its remaining assets (even though this would benefit the economy) and may lead its creditors to throw good money after bad. Conversely, a firm whose assets have gained in value through innovation or reappraisal may be undervalued, and under-resourced, unless MtM is applied.

Because its application was widened (especially through new International Financial Reporting Standards) in the years before 2008, MtM has incurred its own harsh reappraisal since the financial crisis. One key objection is that market value may be difficult to assign, if there is no market or a very thin market for the asset. Taking market valuations of the non-financial companies that encompass specialist physical and human assets, and the financial companies that hold portfolios of individual financial instruments, seems to avoid many of the hazards of marking their component parts to market. But it moves the valuation of capital firmly away from plant, equipment or any other forms of 'real' capital, and towards the financial instruments issued by the companies that comprise these.

A proliferation of values

An analogy can be drawn between the way an economy values its assets and the way an electorate values its politicians. Some voters examine a candidate's past record, using what they have achieved as an indication of what they might now do. But in the political arena, as in any other marketplace, past performance is a very poor predictor of likely future performance. Some voters are swayed by a candidate's

promises, the list of future pay-offs they plan to deliver if elected. These are, no less than predictions of a project's future income flows, subject to heroic assumptions about what will follow from the chosen actions, how these outcomes will be valued, and what other actors will be doing in the meantime to affect those outcomes and values. Unconvinced by the political wing- mirrors or crystal balls, voters also assess a candidate's immediate qualities and saleability. Appearance, public demeanour and reactions to ephemeral events become inordinately important, with past record deemed irrelevant and future strategies a meaningless distraction. Neither reviewing the past nor appraising the future has demonstrably helped to choose the best candidates at past elections. So MtM – which requires no reading of histories or manifestoes – now competes with the other approaches. Opinion polls in which representative samples give their verdict and 'prediction markets' on which informed speculators put money on their opinion vie with each other on accuracy and figure increasingly in election debates, where financial and electoral regulations allow.

Conclusion

The observation that the private enterprise works to minimize its requirements for capital and that economies seem increasingly able to grow without it could prompt several plausible explanations. Capital may have changed its form, into one that is overlooked in conventional measures. It may have moved beyond the economies to which those measures have been applied – notably into high-growth emerging markets, which have taken over much of the industrial production shed by the OECD. Or it may no longer be needed in the quantities previously viewed as essential because ways have been found to use it more efficiently or even operate without it.

The conceptual and geographical broadness of the conventional measures reviewed in this chapter reduces the likelihood of capital being missed out or having moved out. But the third possibility, of dwindling capital requirements, raises the question of what happens to induce them. Is capital becoming unnecessary? Or has it just become so hard to obtain, and retain, that businesses and governments are forced to manage without it? To answer this, the next step is to disentangle capital from its deceptively interchangeable counterpart, wealth.

5

The Destination of Wealth

'Classical' economists, notably Adam Smith (1979 [1776]), are often depicted as having focused on the origin of wealth. Critics of contemporary economics accuse it of losing this focus, shifting attention to circular flows of income regulated by price. The 'neo-classical' approach is accused of lacking a theory of value, ignoring the stock implications of income and expenditure flows (Godley & Lavoie 2007), and artificially separating distribution from production through arbitrary assumptions about production functions and their marginal properties (Eatwell & Milgate 1983). The 'neo-Keynesian' approach, even if acknowledged as more than 'neoclassicism with sticky prices', is accused of prioritizing problems of short-term stability when the central puzzle should be how to achieve long-term growth. So when reappraisals and reorientations of economics are suggested, they tend to assume this means returning to a focus on the origin of wealth (e.g. Beinhocker 2005, Coyle 2007, Stonier 1983).

But on closer inspection, 'classical' economics (and most subsequent strands except the neoclassical) deals largely with the *destination* of wealth. The form in which firms and individuals store their income, when they do not immediately spend it, significantly shapes the conditions for future income generation. The security of such storage and the means available for it affect the manner and motivation for today's income generation. The more an economy develops, the greater the legacy of existing wealth, and the larger its impact on the conditions for new wealth production. Wealth stocks dominate production flows in higher-income economies. The practical and analytical consequences are downplayed by 'neoclassical'

analysis – which, ironically, inherits a Marx-inspired preoccupation with where ‘value’ comes from, neglecting whom it flows to and how they attempt to preserve it.

Different motivations, different destinations

Resources saved up during an individual’s or household’s lifetime are largely expended within that lifetime. They may be wholly or partly used up when retirement or adverse life events occur, removing income. Some may be lost when investments go sour or are eroded by inflation. Some are likely to be taxed away. But as time passes and economies grow, people tend to accumulate more unspent resources during their lifetimes, and (despite longer retirements) have more left over at the end to bequest. The importance of studying where people store their wealth, once they have it, increases as the stock of wealth expands.

As acquiring and storing wealth is a major motivator of economic activity, the options for storing wealth have a significant bearing on the scale and success of wealth-creation efforts. In addition to this, the forms in which previously created wealth is stored have a significant impact on the conditions for present and future wealth creation. In fewer words, the means and incentives for adding to present wealth depend on where that wealth has gone and what form it now takes.

There are broadly two ways for an individual to find financial security. The usual strategy is to seek paid employment and survive on labour income. This is highly risky in the early stages of economic development: those who do not work do not eat, which soon becomes a debilitating vicious circle. But the risks are brought down as governments learn how to keep economies closer to full employment, legislate to improve conditions and pay, and extend social supports for those who lose jobs or become unable to perform them. Provided employment is reasonably continuous, income will be reasonably continuous, but will rarely reach great heights even with promotions and bonuses.

The higher-risk, potentially higher-rewarding, strategy is to acquire or set up a business or other asset and survive on ownership income. The ownership route can build personal fortunes much more quickly: by entitling the owner to all the residual business income (when wages

and other expenses have been paid) and to capital gains that can arise when the business is (or assets from it are) resold. This road to riches has been sped up in recent years by steady reductions in business taxes relative to those on labour income. Traditionally, however, only a few of those who start businesses attain the greater rewards that go with ownership. Many others experience the downside: it can open the door to capital losses and leave an obligation to pay wages and other expenses even when these far exceed the revenue flowing in.

Whichever route they choose, and however strong the social-security protections on offer, individuals and their families usually try to put some money aside. This forms a store to be drawn on when no income is available, due to adverse events during working life or retirement after it. Some will be stored as money, or liquid assets easily convertible to money, to cover for unpredictable short-notice contingencies. Those with more to set aside tend also to store some in less liquid forms, in pursuit of a return on investment that money cannot provide. The higher return is often ascribed to the sacrifice of liquidity or the risk of capital loss if the asset has to be 'cashed' suddenly. For those receiving income, set-aside takes the form of saving. For those who own businesses or other assets, it takes the form of withdrawing income from the business or selling assets.

In almost every country, the preferred forms of wealth storage have been real estate, precious metals, corporate shareholdings and government debt. In most this has also been the chronological order. Land and property have the virtues (among others) of scarcity and defensibility. Their amount is finite globally and even more limited in the parts of the globe that people cluster, reaching a peak in town and city centres which is usually predictable once the location of these is established. Once occupied, fences and ramparts can make them difficult for others to seize, even if legal titles to ownership are not well recorded or respected. However, real estate generates no explicit income unless rented out, and buildings tend to need maintenance which erodes any rental income generated. Capital preservation and capital gain are the main economic benefits of acquiring land and buildings, beyond those which the buyer needs for housing or can personally farm. Capital gain can usually be multiplied by supplementing the subscribed sum with borrowing, exercising leverage which is often not available for financial asset or precious metal purchases.

Gold, silver and precious stones are also reliably scarce, and defensible one possessed, and may have some display value where this is not an invitation to dispossession. They have the added advantages of portability and of appeal across regions and cultures. This ensured their early popularity as forms of money, which gave them a liquidity advantage over real estate, while exposing them to potential loss of value if there were a sudden influx of supply or loss of trade that fuelled demand. Whereas land and buildings must usually be kept and defended by the owner (or carefully selected trustees), precious metals can be entrusted to banks or other forms of safe keeping. Goldsmiths are often credited with inventing paper money, by issuing receipts for precious metal deposits, which traders could exchange without physically retrieving these. Their discovery that they could lend out a portion of the deposits entrusted to them is often presented as the origin of banking. The possibility of profits on lending encourages bankers to attract and retain deposits by paying interest, adding a stream of income to the preservation of the principal.

‘Real’ and ‘financial’ circulations

From its inception, the financial sector has offered a part-complementary, part-alternative strategy of using financial instruments to expand wealth as well as just store it. Reinvestment of returns and/or appreciation of an asset’s resale price can go beyond protecting the originally invested wealth against inflation and actually expand it in real terms. If successfully deployed, this enables some ‘professional investors’ to abandon labour as a source of income and survive entirely by expanding their capital and living off its income.

For a financial or real asset to gain value in real terms, there must be an underlying process that expands production and income. For stocks and bonds issued by companies, this value-added process is the company’s ongoing production, provided it stays profitable. For government bonds, it is the growth of the economy, which allows the raising of additional tax to repay bonds with interest and/or the security for new public borrowing to repay the old.

For other wealth-storing assets – such as real estate and gold – value is added by production and labour income elsewhere in the economy, which enables more purchasers to enter the asset market. Investors are then assured of continuously increasing demand for assets that

are in relatively fixed supply, causing their resale prices to rise in real terms. Provided enough new investment is directed at a fixed stock of 'second-hand' assets, their appreciation can provide a positive real return even if they pay no interest or dividends equivalent to those on bonds and shares.

From an investor's viewpoint, 'new' assets such as freshly issued equity and debt can be viewed interchangeably with 'used' assets such as real estate, precious metals, and already-issued equity and debt. All offer real returns through a combination of income and capital gain, and a diversified portfolio is likely to mix them. From a macroeconomic perspective, 'new' and 'used' assets are also interchangeable in terms of their effects on the 'circular flow'. Income that flows into new issues is redistributed and will reappear as expenditure – by the companies and governments that issue it or by the investors who receive debt repayments or share buybacks from them. Income that flows into existing issues, or other second-hand assets, will reappear as expenditure by those who have sold them (who, if they reinvest, will pass a lump sum down the buyer/seller chain until it eventually reaches someone who is disinvesting in order to spend).

However, assets differ importantly in their sources of capital appreciation. The proximate requirement, in all cases, is for demand (conveyed through spot markets, and forward or futures markets where they exist) to rise faster than supply. But the route to satisfying that requirement differs across asset classes. For corporate equity, the scope for rising relative demand is mainly determined by the issuing company's future activities – the profitability of its products, its propensity to distribute or reinvest profits and to dilute existing shareholders, likelihood of takeover, and other features determined by its ongoing economic activity. For government debt, prospects for appreciation depend on developments in the whole economy and their impact on inflation and interest rates. These might be termed 'objective' causes of appreciation, or depreciation, which link investors' anticipation of these to real economic decisions and events.

For most other assets, including real estate and precious metals, the future demand and supply shifts that determine appreciation (or depreciation) are more reflexively linked to investors' anticipations of other investors' anticipations. This is the world of Keynes (1936: 154–5) in which professional investors 'are concerned, not with what an investment is really worth to a man who buys it "for keeps", but

with what the market will value it at, under the influence of mass psychology, three months or a year hence'. The arrival of capital markets with many more instruments (including forward trades and derivatives) has not fundamentally altered.

Wealth exceeds capital

If capital comprises all instruments – physical or financial – that generate flows of income over time and can be retraded on this basis, and if all capital is privately owned, then it should be possible to treat private wealth and private capital interchangeably. Authors who do this, such as Piketty (2014), make it a legitimate move by excluding capital that is not privately owned (mainly the 'natural capital' in common-pool resources such as forests and oceans) or that is not tradable between private owners (mainly human capital). They are also careful to select measures of *net* wealth that exclude assets which are merely someone else's liability. This ensures that aggregate wealth can emerge from summing that of individuals. Netting-out also makes it possible to ignore publicly owned capital, having established that public-sector net worth has been largely eliminated by rising government debt and asset sales.

Despite these qualifications, equating wealth with capital raises serious problems. Capital generates future flows of income through production. Wealth includes not only claims to the ownership of capital, and/or the income stream it generates but also assets which generate future flows of income through redistribution. Wealth 'stored' in real estate, precious metals and/or government debt yields income to its owners only by extracting income from others in the economy. If property prices (hence implicit and explicit rents) rise, there is a redistribution from tenants to owners. If gold prices rise, there is redistribution from later buyers to earlier buyers who choose to sell. Income on government debt is paid to those who hold it from (ultimately) taxpayers who do not, and anticipation of rises in this income creates capital gains on bonds or shares.

Wealth represents purchasing power, created by past production, that has not yet been exercised. It has instead been saved as money (the token of an uncompleted transaction) or 'invested' in an instrument designed to turn today's forgone consumption opportunity into a future consumption opportunity that is larger in real terms.

The consequence of even a low rate of private-sector saving is that wealth builds up over time, until it reaches a multiple of annual production and national income. Without the disruption of war, technical change and corporate and government defaults – which destroy some of the instruments in which wealth has been invested and/or force populations through phases of hardship in which they must consume out of wealth – countries' wealth-to-output ratios would continually rise. Indeed, the real mystery of Piketty's (2014) assessment of capital as wealth is not why its ratio to income rose so high in the late 19th and early 21st centuries but why it dropped in between.

Capital comprises tangible or intangible resources, created by past production, that can combine with labour and raw materials to generate future production. The capital now in existence may, over time, generate all the output that would enable today's wealth to be fully consumed. But there is no reason to expect the consumption enabled by wealth to match, at one point in time, the production enabled by capital. If an attempt were made to consume all existing wealth today, demand would greatly exceed production at present prices, which could therefore have to rise substantially to achieve the appropriate rationing. Wealth should in principle be equated not to capital but to the present value of all future output that will flow from capital. A rising ratio of wealth to national income actually implies a rising efficiency of capital and a *falling* ratio of capital to income, emphasizing how distinct the two concepts should be kept.

The introduction of financial assets, and financial valuations of real assets, breaks any identity between wealth and capital. Once the assets that comprise wealth include financial claims to the capital stock (such as shares and bonds) as well as the capital stock itself, wealth (W) can go above or below the value of the capital stock at current market prices (K). The valuation ratio, W/K , can exceed 1 when financial markets boom and drop well below 1 when the booms end. Increases in saving can push up the ratio, as more wealth is channelled into existing financial assets, bidding up their market prices.

At its most basic, financial intermediation allows investment (I) to differ from saving (S), any excess of S over I leading to the accumulation of financial assets (at home if there is a counterpart fiscal deficit and/or abroad if there is a counterpart capital outflow). If $S > I$, the private sector accumulates claims on capital (wealth) faster than capital itself. Basil Moore (1975) pointed out, with a simple model in

which private-sector wealth is held in equities, that when the return on savings r exceeds the real GDP growth rate g , there will be an increase in saving that progressively raises the wealth-to-income ratio W/Y . He thereby anticipated Thomas Piketty's (2014) 'second fundamental law' by almost 40 years – without the fanfare, but in an analysis which traces the result to a clear distinction between wealth and capital which his rediscoverer lacks.

Conversely, the wealth-to-capital ratio will be reduced by faster economic growth (which raises national income Y in relation to W) or rises in the capital-to-income ratio (K/Y). This merely reflects the identity $W/K = W/Y \times Y/K$. A fall in the productivity of capital reduces future profit prospects and pushes down the value of claims to future profit. A fall in the private saving rate will also bring down the ratio by depressing share and bond prices. Jan Toporowski (2000) demonstrates this, with a fall in private-sector saving – as an ageing population shifts towards drawing down accumulated pension wealth – dragging equity prices down.

Individuals to institutions

Long-term saving began as a minority pursuit. Almost everyone, even on the lowest incomes, tried to put aside a sum of money for contingencies, but mostly it took only one bout of ill health or job loss for this to be used up. National income growth did not immediately widen the desire or ability to save. Although the first Industrial Revolution's 'standard of living debate' has been hotly contested, there is a phase in most such transformations when those with existing wealth gain higher returns from it, while those without it find living costs level pegging or outpacing their income.

The incentive to save increases as changing tastes and technologies raise the risk of having to change jobs (and spend time between them) and as lengthening life inspires the hope of spending some of it in retirement. Private insurance offers a variant on precautionary saving, linking payouts more to the severity of the adverse event than the size of premium payments, but it keeps to the same principle of creating a fund that a household can draw on when its income is disrupted. Welfare states have rarely reached a level of generosity that absolves individuals of their own contingency planning, and most are anyway built on a socialized version of insurance principles, with contributions necessary though not sufficient for receipts.

Even if assured of steady income from work, individuals or their households need a store of unspent resources to draw down on retirement or when expenses are unusually large. For most, the store must also cover periods when work is not regularly available, or adequately remunerated, or when illness prevents it being done. Within their lifetime most individuals and households try to build up a store of unspent resources, because few can absolutely rely on any external source of funds for adverse contingencies and retirement. No welfare state or insurance policy ever guarantees such support; no expected inheritance or extended family will necessarily be able and willing to help out. The opportunity to save also increases as incomes rise, provided essential living costs do not rise in tandem. Today, insurance and pension funds representing many 'average' wage earners line up alongside the private banks and family offices that manage the biggest fortunes.

These investment institutions may, by pooling contributions and enabling more diversification, preserve and enhance the 'average' savings and pension pot at least as effectively as the 'family offices' of the distinctly above average. According to a legend that has reasonable empirical verification, family fortunes rarely endure for more than three to four generations. Whether by stringent inheritance taxes, divisive inheritance arrangements, incompetent family financial mismanagement or business misfortune, rags-to-rags is a more usual story than enduring riches. If the ever-increasing wealth of the Rothschilds and Rockefellers catches attention, it is only through their rarity value, or the 'saliency bias' that has recently enchanted behavioural economists.

However, the fact that concentrations of unspent resources rarely stay concentrated for long within individual families should not be allowed to obscure the way in which unspent resources build up over time. The extra-lifetime wealth is frequently redistributed, but not automatically depreciated or destroyed. If individuals and families kept their wealth in individual firms, its lifetime would be relatively short, as few firms stay durably profitable even if they manage to stay durably alive. Even if individuals diversified their wealth across the whole spectrum of firms, they would struggle to keep growing it, given the inability of fund managers to defy the efficient marketers' 'random walk' prediction. But by taking their wealth out of firms and channelling it to non-commercial assets, households improve the chance of keeping their wealth intact and create the scope to keep it increasing, almost without limit.

Paradoxically, keeping wealth tied up in 'productive' asset holding (company equity and debt) guarantees to limit and eventually disperse it. Transferring it to 'unproductive' asset holding (real estate, precious metals, fine art) appears to offer a way to keep it intact and enable it grow without limit. Because the further growth arises from revaluing existing assets, rather than adding to their number or quality, this tends to involve a fallacy of composition. Individuals' perceived capital gains cancel out rather than adding up, so that the additional wealth will dissolve if too many try to take it out of storage. 'The excess of disposable income over earned income due to capital gains rests on an illusion, since if wealth owners collectively decided to realise their gains, the gains would disappear' (Moore 1975: 881n.). But the illusion tends only to be exposed during crises, when asset values fall and investors try to realize their gains before this happens. In the sometimes-extended interval between crises, budgetary decisions are taken as if capital gains are real, leading to 'wealth effects' which exacerbate the cyclical rise and fall in production and income.

Hoarded, not invested

The purchase of second-hand goods does not contribute towards national income, and the purchase of second-hand assets does not expand the capacity that produces national income. However, resold assets can still rise in price – conferring capital gains unrelated to their future income-generating potential – if demand for them outstrips supply. This is because financial intermediaries do not channel all unspent income back into circulation (via loans for investment and consumption), but retain some of it for the re trading of financial assets.

'Financial institutions do not supply all of the saving they get as funds to non-financial business and households for financing real activities (investment in real capital or consumption) which are activities part of the circular flow of money. A portion of current saving remains within the financial system and is used for trading financial assets (all kinds of financial securities) among financial institutions, households and firms without being re-injected into the circular flow of money' (Binswanger 1997: 111). This modern form of 'financial hoarding' is, Binswanger points out, not a concept confined to neo-Marxian concepts of 'financialization'. It arose in parallel with

Keynesian thinking, especially via the work of Dennis Robertson (1940); it gains applicability in a world where banks create money, and where savers can choose among a range of financial assets offering different prospective returns, as well as money.

Economists traditionally viewed income as being either spent or saved. If income is saved, it adds to the saver's stock of wealth. But these savings 'flow' to another part of the economy, where someone else will spend them. Savings deposited in a bank will be loaned to a borrower, for consumption or investment. Savings used to buy bonds or shares will finance corporate expenditure. Savings placed in government bonds enable the government to spend more. (Or if the government is rolling over its debt, new bond sales finance the redemption of old bonds, paying back past bondholders who either spend the money or buy another financial asset whose seller can spend the proceeds.) It is only because saved income is spent somewhere else that savers can expect to be paid some interest. The expenditure 'financed' by saving is on investment that generates a return or consumption that enables others' investment to yield a return. So part of these returns on investment can finance interest payments to savers. There is ongoing debate on whether these payments reward savers just for 'waiting', or for sharing some of the investors' risk, or for the risk of inflation while waiting, or whether they are just a gratuitous extraction by the rich, but the payment of interest on savings is usually observable even if the reasons are obscure.

In practice, few savers hold all their wealth in bank accounts or in financial instruments like bonds and shares. At all stages of development (from 'primitive' tribes with no money to modern economies with 'sophisticated' financial systems), a significant proportion of savings flow into real estate, precious metals and other physical property. From a conventional economic perspective, this is not saving at all, but expenditure on durable goods. People who buy these will receive income as rent (implicit or explicit) and capital gain (if the asset's resale price rises), rather than interest; indeed, some will be paying interest out of this income, if they have borrowed to finance or to leverage their durable asset purchase.

If these expenditures are viewed as saving, they raise the awkward question of where the saved income 'flows' to, so that equivalent expenditure can occur elsewhere in the economy. This can be answered very easily by observing that every purchase is a sale: the

seller of real estate or gold (or of bonds and shares) receives income, so the 'circular flow' goes on as normal. But these are conventional sales only if the land is newly reclaimed, the property newly constructed or the gold newly mined. In the majority of cases, the traded asset already exists, and its sale on the secondary market is merely a transfer of entitlement. The buyer may pay with income that has been generated by new production, but the seller receives that income without having to engage in new production.

The possibility of a 'financial circuit' of money, separate from the circular flow of income, strengthens the need for an analytical distinction between capital and wealth. Capital consists in 'real' means of production, giving rise to output of goods and services and income from their sale. Wealth consists of entitlements to this capital, and its income, but takes the form of financial instruments representing the 'real' capital that interchange with money. Even if wealth equals capital, by virtue of the definitions reviewed in Chapter 2, these stocks and their associated flows have contrasting economic and social implications.

Financial investment, adding to wealth, benefits the individual investor but has an external cost to the economy. The individual's entitlement is increased, but only by diverting unspent work income (or distributed investment income) into a wealth store that makes it unavailable as current demand or as finance for productive capital spending. Real investment, adding to productive capital, benefits the economy but has an external cost to the individual investor. Whether or not it generates any private profit, the investment outlay adds to demand and employment income, promoting the return on others' capital. But the individual making the investment can rarely capture all the benefits that flow from it (which include information on the viability of new products and markets which others can costlessly appropriate) and risks acquiring assets of very uncertain value while running up fixed and inescapable liabilities.

These external costs and benefits tend to drive the privately assessed return on wealth above the privately assessed return on capital, even though real investment (in new assets) is better than financial investment (revaluing existing assets) from a social viewpoint. This leads to a recurrent problem of financial investors' rate of return (r) exceeding real investors' rate of return, which is ultimately limited by the economy's real growth rate (g). That $r > g$ underpins contemporary woes is a conclusion shared by economists as diverse as Piketty (2014),

Lapavitsas (2013) and Taylor (2012). All highlight the capacity, in economies with endogenous money and liberalized financial sectors, to create capital gains through an inflation of asset prices while simultaneously keeping up profit rates by restricting deployment of capital for non-financial uses. The consequent booms can outshine those that preceded 'financialization', but have much more troubling consequences when they burst.

Capital will only be attracted from financial transactions (seeking gains through asset revaluation) back into real commercial transactions (seeking returns through profitable production) if non-financial firms' return on new capital investment exceeds the rate of interest and the returns available on retraded financial assets. The sequestration of capital in its financial circuit, when restructuring the stock is more profitable than expanding it, can explain why non-financial firms behave as if capital were scarce and expensive even when a surplus of savings (and low interest rates) suggest that it is abundant and cheap.

Financial hoarding of this type may explain why inflation remained globally low in the years after 2008, despite massive monetary emissions which (according to previously favoured monetary theory) should have fuelled it. The quiescence of inflation in the decade before the crisis, despite strong private-sector credit growth, had already led many 'monetarists' to sharpen their distinction between money and credit. Expansion of the money supply (they argued) boosted demand without directly improving supply, and so was inflationary. Expansion of credit boosted supply without directly raising consumer demand, and so was neutral or deflationary. When banks engaged in leveraged stock-market purchases, or lent for leveraged real-estate investment, they expanded the financial circulation (and raised asset prices) but did little to boost the circular flow of income. When central banks engaged in quantitative easing, to keep up the supply of credit as commercial banks reined in their lending, they too expanded the financial circuit's 'credit aggregates' without excessively expanding the commercial circuit's 'monetary aggregates' (Tice 2001).

Asset shortage

A consequence of wealth exceeding capital is that demand for assets capable of reliably storing and augmenting wealth tends to outstrip supply. Asset inflation becomes built into the system. A consequence of asset price inflation is that new savings are increasingly attracted

into the economy's financial circuit, exchanged only for financial assets, with dwindling incentive to switch them into the commercial circuit where they might finance the expansion of real production capacity. Surplus of investable wealth can thus coexist with growing shortage of funds for industrial investment, and non-financial companies are forced to economize on their use of capital in order to keep up their rate of return.

The existence of a worsening 'asset shortage' became increasingly evident in the build-up to the 2008 global financial crisis and provides a major alternative explanation to the 'savings glut' arguments reviewed in Chapter 1. Steady GDP growth during the 'Great Moderation' of the 1990s and early 2000s enabled governments to pay down debt, reducing the volume of public bonds still in issue and rolling them over at lower interest rates, to reflect increasing tax capacity and lower inflation expectations. Growth also enabled corporations to pay back debt and buy back equity, financing more of their investment through profit retentions. The supply of high-quality shares was further reduced by mergers and acquisitions, and by the growth of private equity funds, removing firms from the publicly traded markets where institutions could buy them.

While available financial assets were disappearing, many of the world's private and public sectors were enjoying rising real revenues which left them wanting more to buy. The pressure on households to channel savings into financial assets was raised by governments' retreat from (or refusal to build) tax-financed systems of welfare and retirement income and by banks' increasing use of wholesale funding, which reduced the interest rates they need to pay to attract term deposits. It was clear by 2006 that '[t]he world has a shortage of financial assets. Asset supply is having a hard time keeping up with the global demand for store of value by households, corporations, governments, insurance companies and financial intermediaries more broadly . . . globalisation spreads the shortages from specific regions to the world at large' (Caballero 2006: 2, 6).

So where's the capital?

The gap between the wealth of nations (stored-up spending power) and the capital of nations (resources for generating output to satisfy expenditure) becomes clear from available measurements of national

capital stocks. Whatever the method used, the results show 'productive' capital stock – plant and equipment – to be a small proportion of the total. Most 'capital' comprises residential housing and other real estate, and these also tend to be the fastest-growing components.

For example, the Eurozone capital stock is calculated by Eurostat using the perpetual inventory method (PIM, as specified in the ESA95 framework, still in use in 2014). Gross capital stock, 'all fixed assets still in use', is calculated by summing annual investment spending on various types of fixed assets, assigning each a standard average lifespan. Investments in previous years are raised to present value using a price index for the particular fixed asset type, so that gross stock is measured at its replacement value. Net capital stock is obtained by adjusting gross capital stock for 'the depreciation of the assets through time as a result of physical deterioration, foreseeable obsolescence or normal accidental damage'. The ESA definition of physical capital includes production machinery and transport equipment, commercial and residential property, and products including those of agriculture, fisheries and forestry. It excludes land, on the basis that this has not received any investment until it is brought under commercial forestry, agriculture, production or mining operations. The results, for the 17 Euro Area members in 2013 and at selected dates back up to 1980, are shown in Table 5.1.

The US situation in 2013 (Table 5.2) showed something of a mirror image in regard to structures, with non-residential structures comprising 45% of fixed assets (slightly up from 2006) and residential housing only 35% (slightly down). But as in Europe, these proportions

Table 5.1 Composition of gross capital stock, Euro Area 17, %

| | Machinery, transport equipment | Housing | Other constructions | Other | Total (EUR/ ECU 2005 prices) |
|------|--------------------------------------|---------|------------------------|-------|------------------------------------|
| 2013 | 17 | 43 | 34 | 6 | 46,721,446 |
| 2007 | 17 | 44 | 36 | 3 | 41,931,159 |
| 2000 | 17 | 45 | 38 | 0 | 33,505,631 |
| 1990 | 17 | 45 | 41 | – | 26,004,343 |
| 1980 | 17 | 44 | 42 | – | 19,672,565 |

Source: Calculated from Eurostat, http://sdw.ecb.europa.eu/brosweTable.do?node=2120798&SERIES_KEY=119.ESA.A.16.N.1000.CS000G.0000.1623.L.U.E&SERIES_KEY=119.

Table 5.2 Net stock of fixed assets (at current prices), US

| | Equipment | Intellectual property | Residential housing | Other structures | Total (US\$ bn, current prices) |
|------|-----------|-----------------------|---------------------|------------------|---------------------------------|
| 2013 | 13.4 | 6.9 | 34.9 | 44.8 | 50,949.1 |
| 2006 | 13.1 | 6.1 | 38.9 | 41.9 | 42,506.5 |

Source: Calculated from Bureau of Economic Analysis (2014).

overwhelmed those of equipment and intellectual property, whose share edged up to just above 21% in 2013. Four-fifths of US assets (on this measure) consisted of property, and only one-fifth the machinery and equipment housed within it.

Does an inventory of the capital stock based on censuses and market-based valuations modify the picture, compared to these official estimates? Calculations of private net wealth on this basis presented by Piketty and Zucman (2013b) suggest a bigger role for ‘productive’ capital compared to real estate, as shown by the country examples in Table 5.3. Everywhere (in this sample) except France, Italy and Australia, private wealth is held predominantly in financial instruments, with a smaller proportion in housing and a negligible amount in rural land. If financial assets mainly represent claims on the physical, human and intellectual capital assembled in firms, then capital aimed at saleable output comprised (in 2010) around three-quarters of the privately held total in the US and Canada and over half in Germany, the UK and Japan. Residential housing and land exceeded financial assets’ share in France and Italy (where they reached around 50%) and Australia (over 40%). But as non-financial assets comprise mainly unincorporated businesses, Table 5.3 can be taken to mean that direct and indirect holdings in ‘real’ income-generating assets comprised 70–80% of private wealth in North America and Japan, 55–60% in the UK, Germany and Australia, and 40–50% in France and Italy in the early years of the 21st century.

Although it extracts only data from 1990 (the Piketty–Zucman database goes back several more decades in most cases), Table 5.3 also confirms the volatility of the main wealth components – financial instruments and housing – when valued at current market prices. Housing’s share rises sharply in most countries between 2000 and 2010, at the expense of financial assets’ share, mainly because the

Table 5.3 Composition of private net wealth, various countries, 1990–2010 (percentages)

| | Financial assets | Non-financial assets excluding housing | Housing | Agricultural land | NPISH ^a |
|----------------|------------------|--|---------|-------------------|--------------------|
| Germany 2010 | 51.7 | 7.8 | 39.8 | 0.7 | – |
| Germany 2000 | 56.7 | 9.3 | 33.4 | 0.8 | – |
| Germany 1990 | 49.8 | 11.3 | 37.5 | 1.7 | – |
| UK 2010 | 56.7 | 2.7 | 40.0 | 0.6 | – |
| UK 2000 | 65.8 | 3.1 | 29.9 | 1.0 | – |
| UK 1990 | 50.3 | 5.8 | 42.3 | 1.9 | – |
| France 2010 | 39.1 | 5.4 | 52.3 | 2.1 | 1.0 |
| France 2000 | 51.3 | 6.1 | 38.0 | 3.5 | 1.1 |
| France 1990 | 42.9 | 10.2 | 39.9 | 6.4 | 0.5 |
| Italy 2010 | 42.3 | 8.4 | 46.7 | 2.7 | – |
| Italy 2000 | 50.6 | 8.0 | 38.2 | 3.4 | – |
| Italy 1990 | 43.1 | 9.2 | 43.3 | 4.5 | – |
| USA 2010 | 77.1 | 0.5 | 19.5 | 2.9 | – |
| USA 2000 | 73.3 | 0.4 | 24.7 | 1.8 | – |
| USA 1990 | 64.0 | 0.5 | 33.1 | 2.4 | – |
| Canada 2010 | 74.3 | 1.7 ^b | 24.0 | – | – |
| Canada 2000 | 80.5 | 2.2 ^b | 17.3 | – | – |
| Canada 1990 | 72.8 | 3.7 ^b | 23.5 | – | – |
| Japan 2010 | 65.1 | 8.0 | 20.8 | 2.5 | 3.5 |
| Japan 2000 | 57.4 | 10.4 | 25.0 | 4.2 | 3.2 |
| Japan 1990 | 37.9 | 14.2 | 36.3 | 7.2 | 4.3 |
| Australia 2010 | 42.5 | 13.3 ^b | 44.2 | – | – |
| Australia 2000 | 45.0 | 14.7 ^b | 40.3 | – | – |
| Australia 1990 | 36.8 | 18.9 ^b | 44.0 | – | – |

^aNon-profit institutions serving households

^bIncludes land

Source: Calculated from Piketty and Zucman (2013b) Piketty–Zucman Wealth-Income Data Set, Tables DE6c, UK6c, FR6c, IT6b, US6c, CA6c, JP6c, AU6c, <http://piketty.pse.ens.fr/files/PikettyZucman2013Databook.pdf>

‘crash’ of 2008 affected bonds and stocks more severely than houses. Financial assets may have been penalized on this measure by the greater ease with which they can be marked-to-market: homeowners can conceal the drop in their house price to the extent that they can avoid selling during the downturn, appealing instead to their earlier (higher) purchase price as the appropriate value. As the table says nothing about wealth distribution, it may also reflect a political

choice, given that homeowners outnumbered in all these countries. Governments were more inclined to adopt policies that propped up the price of houses (owned by a majority) than the price of financial assets (still held mainly by an affluent minority), so that housing's share of total wealth actually rose after the crisis.

The role of real estate is underplayed in this private-wealth perspective, however, since it eliminates non-residential structures. These are mostly owned by private corporations, so are subsumed into the 'financial asset' category. (And the sizeable portfolio of buildings and physical infrastructures owned by the state has been omitted from Table 5.3, which focuses on private wealth.) Comparison of countries common to Tables 5.1–5.3 suggests that non-residential real estate could account for a substantial share of the value captured in financial assets. Land and buildings are a major element in countries' financial wealth, as well as the predominant component of their non-financial wealth. Elsewhere in their research, Piketty and Zucman classify the capital stock into housing (plus land, which was a negligible proportion of wealth by 2000) and 'domestic capital assets'. These include commercial buildings – resulting in a much larger attribution to commercial physical capital than in the Eurostat and Bureau of Economic Analysis data, where buildings are distinguished from the equipment they might contain. Despite this, the wealth measure shows that residential housing had by 2010 become the biggest component of industrial countries' capital stock. Housing's contribution exceeds that of plant and machinery even in Germany, noted for its strong record of investment in physical capital and resistance to residential property bubbles.

Piketty's (2014) contention that capital has outgrown national income since the 1950s, restoring rich countries' capital–income ratios to their C19th levels, depends heavily on this inclusion of housing as capital. For the European countries on which he presents data, the fall in capital stock from 1870 to 1950 is predominantly caused by a shrinkage (relative to GDP) of 'other domestic capital', defined as commercial plant, equipment and buildings. Housing's share tends actually to decline in the first half of the 20th century. The rise in capital stock since 1950 is predominantly caused by an expansion (relative to GDP) of the valuation of the housing stock, which more than offsets the continued fall in aggregate land value. Even Germany, whose ratio of wealth to national income is unusually

low in European comparison (around 400% in 2010, a gap which Piketty and Zucman [2013a: 240] associate with rent controls depressing property values), had seen housing's share of the capital stock rise close to the UK's by 2010.

Omitting housing from the definition of capital would reverse Piketty's (2014) conclusion, showing the capital–income ratio to have stabilized or fallen in the 20th and early 21st centuries. This rise in the productivity of the capital that is relevant to production is needed to explain the other 'stylised facts' observed by Piketty and his co-authors, which are otherwise anomalous. The capital associated with production becomes ever more productive, generating increased GDP, which allows the expansion in wealth – claims on production – that is the focus of Piketty's work. Without this increase in capital productivity, it is hard to see how (as Piketty claims to show empirically) the return on capital (r) can exceed the GDP growth rate (g) for long periods or how (as he suggests theoretically) the capital stock can keep rising without pushing r down. The growth in capital stock Piketty presents is essentially a growth in a non-productive source of wealth, centred on housing. The increase in productivity of the (now much smaller) production-relevant capital stock enables GDP to keep growing – and the owners of capital to keep reaping the benefits – despite the spectacular collapse in capital productivity implied by Piketty's aggregate data.

Unreal estate

The major alternative to financial instruments as a wealth store is land and buildings, especially residential property. The growing priority of wealth storage over wealth creation, as average personal and national incomes rise, helps to explain why real estate and other non-production forms of capital expand their proportions of the total as countries grow richer. A crude but effective logic says that when the world's land area is fixed (or even shrinking due to desertification and rising sea levels) and its population rising, demand for real estate will perennially outgrow supply. When population is not only expanding but inexorably urbanizing, land and buildings near the centres of cities will experience particular excess demand. Real-estate prices will still fluctuate because *effective* demand depends on borrowers' incomes and lenders' core capital (and the degree of regulatory

relaxation), which can all suffer temporary downturns. But despite continuous attempts to multiply the effective land area by building high-rise blocks, converting rural land into urban or reclaiming it from marsh and sea, the growing number of people and their desire for more private space suggests that the long-term trend in house prices can only be up.

The rising proportion of national wealth constituted by non-residential property, for which there is some evidence in Tables 5.2 and 5.3, raises the possibility that commercial buildings are becoming more directly productive over time – perhaps because of the increasing amount of digital technology built into their fabric, interior environments that improve employee productivity, gains in energy efficiency and reductions in environmental impact. But studies of technological progress in commercial structures have generally concluded that their contribution to GDP growth is comparatively small and diminishing over time (Barras 2001, Gort et al. 1999). The rise in property's share of total wealth is, like that of residential housing, more traceable to the rising cost of its services, implying increased wealth-storing attractiveness that defies – and may even be promoted by – low productivity growth.

The demand for housing as an asset class is especially visible in low-income countries, where it has the added advantages arising from physical durability and immobility. Ownership can be asserted and defended by physical occupation, in contrast to the often shaky judicial protection for claims on financial assets or other funds entrusted to intermediaries, and materials are hard to steal (even when the owner is absent) when cemented together and stuck to the ground. 'Driving from the city centre toward the less affluent suburbs in almost any developing country, one is struck by the number of unfinished houses. . . . If you ask owners why they keep an unfinished house, they generally have a simple answer: this is how they save' (Banerjee & Duflo 2011: 183).

Residential property demand in high-income countries has seemingly even more to recommend it. This is the only major purchase for which ordinary households can borrow – with collateral residing in the house itself, so that high and steady income need not disbar them from getting a mortgage. As a home is needed in any case, it serves a dual purpose when it also constitutes investment: money that would otherwise be paid in rent can now be diverted to debt repayments

which are effectively a saving flow, on which capital gains may deliver a return. Combined with empirical associations in numerous countries between owner occupation and better socio-economic outcomes (compared to renting), and with political philosophies favouring property-owning democracy, the opportunity to buy a house is often seized ahead of any chance to buy stocks and shares. In Great Britain, at the height of the property market in 2006–7, more households viewed houses than pensions as the best way to save for retirement, and property matched private pensions as a store of national wealth (Daffin 2009: xx–xxi and Table 8.20).

Although governments have generally promoted it because of perceived social (and electoral) benefits, house purchase constitutes an even stronger ‘financial hoarding’ than share and bond purchase. From a homeowner’s viewpoint, a rise in house prices represents a net wealth increase; so when a majority are homeowners, most will regard house price inflation as a capital gain. But from the national economy perspective, a rise in house prices is just an increase in housing cost, signalled by real increases in explicit and implicit rents. Real-estate appreciation redistributes, but does not add to, aggregate net wealth, unless it somehow unleashes expenditure multipliers through a wealth effect – through equity withdrawal, or reassessment of a ‘bubble’ component to house prices as being fundamental, or (inverting normal assumptions) wealthy homeowners having a lower savings propensity than less advantaged renters (Buiter 2008).

Residential housing could still comprise an essential form of capital, supporting the generation of future incomes, because of its often irreplaceable usage as collateral for loans. Physical property attains a ‘double life’, multiplying a country’s investible capital, when it offers the security that mobilizes credit (De Soto 2000). Whereas industrial assets can generate explicit flows of income even with no debt secured against them, there is no such flow on unencumbered residential assets. Property that is *not* remortgaged or otherwise pledged as collateral becomes, by this standard, a drain on productive capital, locking the ‘equity’ away until a loan is taken out (or a sale made) to release it. Diagnosing Britain’s post-war decline in a chapter bluntly titled ‘The Starving of Productive Investment’, Corelli Barnett traces de-industrialization directly to future prime minister Harold Macmillan’s success at diverting scarce budget funds from industry into house-building. ‘230,000 houses in 1952, 260,000 in 1953,

300,000 in 1954. To him in his present post it seemed absolutely right that re-equipping Britain's widely old-fashioned and worn-out engine room ought to come second to installing commodious new cabins for her crew and passengers' (Barnett 2001: 126).

Keen to rescue the rest of the world from a similar bricking-up of development prospects, mortgage brokers turn from reckless propagators of debt to selfless liberators of trapped equity. Launching 'World Mae', an initiative to globalize the secondary mortgage market created in the US by Fannie Mae, World Mortgage Association chief executive James Jones put the proposition more boldly than most economists. 'There exists today, in countries all over the world, an enormous supply of essentially liquid capital in the form of residential real estate – what we might call "trapped equity". . . . Putting this equity to work inside a given country where no secondary market for mortgages has ever been created is a difficult process' (Jones 1997: 3). If property is part of a financial circulation that drains demand and finance for capital projects from the 'real' economy, then securing debt against property is essential to prevent an economic contraction, even before it can fuel any expansion.

The logic of such 'equity release' seems straightforward. When a property is unmortgaged or a mortgage has been fully paid off, it represents a block of 'equity' that only generates rent (implicit if the owners live there, explicit if they let it out). Only if the owners remortgage is their capital released for potentially productive investment. Interest paid on the mortgage could be viewed as another flow of rent, effectively transferring the owner-occupier's implicit rent to their creditor, a redistribution not linked to any new production. But with the advent of mortgage (and other debt) securitization, creditors can use these new flows of rent as security for another set of loans, some of which might help to finance loans to industry as well as to property owners.

The troubled recent history of mortgage securitization, even within the US, revealed how hard it is to release the 'trap' without letting the capital flee in counterproductive directions. The majority of loans secured against property do not finance much investment beyond improving that property, or trading up to another. Very few go towards direct investment in a business, or even indirect investment in a fund that offers finance for business. Mortgage equity withdrawal has undoubtedly promoted some countries' economic

growth in the run-up to the global financial crisis, and their recovery from it; but household-level data suggest it is mostly used to finance home improvements or redistribute household income across time in accordance with life-cycle models (Benito 2009). Most owners of unencumbered houses do not remortgage them unless it is to pay for maintenance or extension. When they do so to raise funds for productive investment it is usually as a last resort for rescuing a sunset business, not the first choice for a start-up. But in Europe, where homeowners are in a majority everywhere except Germany and Switzerland, and scrambled to pay down debt after the shock of 2008, a revival of mortgage lending and securitization was quickly recognized as a prerequisite for economic revival. 'Securitisation can contribute to a well-diversified funding base . . . The revival of the asset-backed security market can therefore play a useful role in ensuring that there is not a renewed build-up of systemic risk . . . Well-functioning securitisation markets also enable non-bank financial institutions to raise funding for their real economy lending' (Bank of England/European Central Bank 2014: 3).

Unequal shares

Company shares – the production sectors' 'equity' – are an older and arguably better-tested means of keeping capital in general circulation, free of financial entrapment. Compared to public and private debt, shareholders' equity makes a much more recent appearance as a financial instrument, gaining popularity in Europe in the early phases of 'industrial revolution'. It enables an investor to acquire a stake in industrial enterprise, with the possibility of income via dividends, without having to participate in managing the enterprise. Shares become more liquid as secondary (stock) markets develop. These also give an opportunity to boost return on equity through capital gains on the resale of shares, if bought low and sold high (or short-sold high and bought-back low, when such trade becomes available). For start-up companies, which mostly lack collateral or any borrowing history to establish a credit rating, equity is often the only viable source of external funds.

While shares in just one firm expose an investor to the 'specific risk' that it (or the sector it is in) will lose value if it fails, a diversified portfolio can remove the specific risk. Diversification is needed

because investments confined to one firm (or even one sector) would be too much risk to store wealth effectively. A diversified share portfolio can spread risks across firms and sectors (reducing the scope for capital loss) while generating returns that generally exceed those on a comparably spread bond portfolio. The firm is also a device for bundling together items of capital *through* time, representing a totality that stays intact (and can hold or enhance its value) even as individual components are retired and replaced.

The 'equity premium' on returns to share investment reflects additional risk, linked to price volatility and the possibility of management being unable or unwilling to declare any dividend. In principle, the growth rate of income from a large, diversified group of companies is likely to match (and not exceed) the growth rate of real GDP (Han 2000). But by shuffling the portfolio to add new companies whose improving profit prospects raise their share price and deselect those whose deteriorating profit reduces their price, real equity returns can be pushed above the economy's growth rate. Once limited liability is legally recognized (as it has been for partnerships as well as publicly quoted companies, in many countries), there is also a downside protection, capital losses being no greater than the sum subscribed.

At any time, a firm's shares and bonds (whether privately or publicly held) represent entitlements to income from its entire bundle of capital – including the fixed, working, human, intellectual and financial components. An investment in 'the firm' has substantial advantages over investment in a particular discrete project, even though (for ease of explanation) investment decisions are usually depicted on a single-project basis. The firm can run a number of projects at once and a succession of projects through time, diversifying its risk across space and time. Even a single-product, single-project firm represents a complicated bundle of labour and management skills, equipment, intellectual property, and 'social capital' in its links to clients and suppliers. Shares and bonds issued by the firm resemble a primitive 'securitization', a single instrument giving entitlement to a stream of future revenues from a bundle of profit-directed activities. Investment in a single project would bear the specific risk of that project, whose lifetime would limit its term. Investment in a particular machine, or even a particular branch or factory, would be confined to the often short duration and specific application of these subcomponents of a

company. Investment in a whole company, via the securities it issues, can generate income from the entire pool of its activities and last indefinitely because of its ability to renew and replace specific physical and human assets. Securities also enable the basic unit of investment to be scaled down, enabling investment in a diverse range of enterprises with only a small proportion in each.

However, most corporate bonds are of limited value for storing wealth (as their resale price varies inversely with interest rates, and redemption value is fixed) or for adding to wealth (unless offering an especially high interest rate, which will usually signal high non-repayment risk). Corporate bonds can move towards equity-like levels of yield as they become riskier, but only because they move towards equity-like levels of repayment risk as they fall below investment grade. Indeed, with many 'blue chip' shares paying increasingly stable dividends and subject to regular buyback programmes, the most speculative bonds become interchangeable with equities, little different in terms of the income they generate or their chance of being redeemed.

Traditional banking theory treats equity and debt as variants of the same financing channel, linking 'financial' investors to investors in 'real' enterprise. Loans and shareholdings are presented as flows of saving, from people with more money than they can spend to people with an investment plan they cannot fully finance themselves. By buying bonds, lenders reduce their income risk through a fixed repayment schedule; however, they can see the resale value of their loan fluctuate with interest-rate movements and run the risk of losing their principal if the borrower defaults. Share buyers incur more income risk by settling for a discretionary dividend and can see the resale value of their shares fluctuate with the stock market. They can also lose their principal if the business collapses, though limited liability can cap their losses at their original stake. The essential similarity of bonds and shares is, in this analysis, reinforced by their interchangeability. Bondholders may be turned into shareholders if the enterprise defaults and seeks a refinancing, while shareholders can start to look like bondholders as firms start to pay regular dividends and to buy back shares on a regular basis.

Corporate equities and bonds create investment opportunities in non-financial firms, designed to offer a sufficient return to attract funds that might otherwise flow into real estate or other

already-produced wealth stores. Securities in issue, and securitizations of existing debt, are also second-hand already-produced assets. But the existence of secondary markets raises the incentive to buy new issues, and a rising price on secondary markets brings down the yield on new issues, which sets the cost of new capital. According to standard theory, the ratio

$$\frac{\text{Market value of company equity}}{\text{Replacement value of fixed capital stock}}$$

often termed Tobin's q will determine whether investors are better off subscribing new capital to the firm (to enable new fixed investment) or keeping their funds in existing stock-market assets. A rise of q above 1 will induce firms to invest because their cost of capital falls below its expected return. Investment expands fixed capital, so the ratio drops back towards 1. If it falls below 1, the firm will seek to return capital to its shareholders by selling fixed assets, which shrinks the denominator until the ratio is restored to 1. Although such adjustments to the fixed capital stock will take time, the adjustment to q can occur immediately because a valuation ratio above 1 will induce selling of the stock (driving down the value of equity) and a fall below 1 will trigger purchasing of the stock (pushing its value back up).

In practice, Tobin's q has usually been less than 1 in most countries with large and liquid stock markets, except for brief periods at the end of sustained growth bursts (in the US: 1968, 1995–2000, 2004–7, 2010–11). These brief rallies above 1 may reflect the tendency of stock markets to 'bubble' after periods of sustained growth, low inflation and monetary relaxation. The ratio falls back when the bubble bursts – often going below 1 because stock prices (and market valuations) over-correct downwards, while the value of physical capital is little affected. Equity markets, it appears, fight a generally losing battle to induce investors out of entitlements to the income from existing production into the financing of new production. If (as some argue) markets outperform accountants at determining a firm's worth, because they can also perceive and measure the 'intangible' assets, the displacement of q below 1 is explained by the enlargement of the denominator. But the message is that the firm is not making full use of its existing assets, which scarcely strengthens the case for subscribing to new ones.

Has capital just become intangible?

Recent growth might not be so heavily dependent on productivity improvement and capital saving, and savings might have converted more readily into investment than as suggested by the 'glut' idea, if capital has changed its form so that new additions are less visible to old-style accounting. An 'intangible' turn might then explain why the proportion of measured capital that contributes directly to production has remained small, and tended to decline, despite recent national-accounting changes designed to expand it. An obvious riposte to the suggestion that the capital stock has stopped growing, making GDP growth dependent on ever-rising total factor productivity, is that something 'intangible' has been left out of the capital measure.

Recognizing that 'intangible' assets make a large and increasing contribution to value-added, the US and European statistical offices have reclassified a number of private-sector expenditures from consumption to investment. Computer software (despite its often short operating life) was reassigned to investment after the puzzle of the early 1990s, when US industrial productivity growth showed little discernible upturn despite the apparently obvious advances brought by computerization. As of 2014, research and development (R&D) expenditure has been reassigned to investment, the *intention* of expanding future income streams being prioritized over the frequently non-commercial outcome.

Recent economic theory has had no shortage of 'intangible' capitals – notably human capital (skills), intellectual capital (knowledge, sometimes pinned down in patents and copyrights), organizational capital (coordination power captured within firms) and social capital (trust and cooperation among individuals and organizations). Admitting these new categories of capital investment enables firms to shift from immediately expensing the outlay, treating it as a current cost, to capitalizing the purchased item, and spreading the cost over an agreed number of years through depreciation allowances. What was previously a subtraction from national output and value-added is transformed into an addition.

At the national accounting level, capitalization of intangibles significantly raises GDP, as well as recorded investment, and so boosts labour productivity (Corrado et al. 2009: 662). Effects on capital

productivity are less clear, because investment will expand the measured capital stock as well as the flow of output. Evidence for the importance of intangibles can be sought in the behaviour of the aggregate valuation ratio, or Tobin's q , which measures (for all market-listed companies) the ratio of market valuation to replacement cost of capital.

But for the US, Tobin's q has been below 1 most years since records of it began, rising above 1 only at the tail-end of spectacular stock price booms such as those of 1999–2000 and 2004–7. These rises occurred, q -theory's supporters argue, because investors recognized the substantial intangible elements in companies' assets in these years. This pushed up market valuations to a level that raised q well above 1, since the denominator (calculated just on visible capital) was understated. But the tendency of q to drop below 1 is the opposite of what neoclassical analysis would suggest, if intangibles are being ascribed a positive role in future income generation. Ratios of equity value to net worth calculated by Piketty and Zucman (2013b) for other large economies show a similar tendency to stay below unity, even at the best of times. Intangibles undoubtedly form an important component of capital. Their neglect in market valuations adds to doubt on whether a rising stock of capital, financially measured, is essential to corporate or economic growth.

Conclusion

To improve their economic security, people want first to build up their wealth and then to preserve what they have. For most, wealth has always been built up by saving out of labour income and preserved by channelling onto a recognized wealth store – such as property, precious metals or (where they exist) the debt of a reliable government and the 'blue chip' shares of a perennially profitable corporation.

From an individual perspective, it is best for savings to flow into whichever instruments will lock in its current value most effectively and generate reinvestable income at acceptable risk. This has usually meant investing in a combination of 'real' assets (real estate and precious metals) and 'financial' assets (equities and public debt). For the economy of which these individuals are part, it is preferable for savings to finance activities that generate new flows of output and

income. Ostensibly, the individual and collective interests coincide, since it is not clear how every individual's wealth and investment income can grow unless there is a rising production. Only growth, financed by the productive deployment of existing wealth, can generate returns to equity and bond investments (on top of payments for inputs and 'factors of production') and promote expectation of future returns so that asset prices appreciate.

This harmony between individual and collective interests has been increasingly called into question, despite the growth of capital markets designed to channel wealth into its most productive uses. The recurrent complaint is that savings flow into 'unproductive' repositories (real estate, precious metals and second-hand financial instruments) instead of 'productive' uses (new issues of corporate equity and debt). Unspent income then gets trapped in the revaluation of existing assets, rather than deployed in the production of new assets. The problem gets worse as holdings of wealth build up over time, so that the stock of savings from past income overwhelms the flow of current national income (Scitovsky 1994).

Tension is especially evident over real estate, a preferred destination of much individual wealth which does not count as wealth from a macroeconomic perspective. The same tension arises over company shares, once their annual issuance falls below the annual rise in demand arising from personal saving. The price of existing stocks – and new issues – can start to rise not because of ever growing optimism about their future earnings, or diminishing time preference, but merely because there is rising demand for a static or falling supply.

This chapter has sought to make the case that the rising ratio of wealth to national income, influentially charted by Piketty (2014), masks a falling ratio of productive capital to income which actually shows a spectacular increase in its productivity. This is masked by the casual equation of capital and wealth, which ignores well-established contrasts in the way they are measured and evidence for their circulation in two largely separate spheres. The research reviewed in Chapters 1 and 2, suggesting an expanding overabundance of savings and financial wealth, is not incompatible with tendency observed in Chapter 3 for businesses to minimize their capital use. The abundance of wealth may even be a cause of the shortage of capital. A vicious circle ensues when firms economize on

capital, limiting the supply of new financial instruments and fuelling the asset price rises that inflate wealth.

The spread of asset-holding wealth, a triumph of economic growth and liberal democracy, makes the consequences more macroeconomically painful over time, by creating a class of investors who cannot absorb the pain of sudden asset-price correction. The implications of this, with its enhanced but contested role for macroeconomic management and public debt, will be examined in the final chapter.

6

Economics without Capital

If capital's role in economies has been substantially reduced, can its long-troubling presence in economics fade into the background? That would certainly make life easier for many practitioners and students of the subject, for whom defining capital has been an insoluble and infuriating task for several generations. It is entirely possible that this entire book was encapsulated in a single sentence, 70 years ago, by arguably the greatest of all capital theorists: "Capital" is not what capital is called, it is what its name is called' (Robinson 1954: 83). But as some much longer books have had to be written to explain this sentence – and agreement has still not been reached – dispensing with the term and the concept might pay dividends all round.

In the crisis of the 1930s, those building the fledgling economic 'science' focused on flows – of investment, consumption and exports – because these were the ones whose collapse had led to mass unemployment. Keynes deliberately focused his *General Theory* on the 'short term', in which investment spending added to aggregate demand while the effects on capacity and aggregate supply could be safely set aside. The concept of a circular flow of national income, and the decision to put national income and expenditure at the centre of the post-war system of national accounts, followed quite directly from this analysis. A capital stock does loom large in Keynes' analysis of aggregate demand deficiency. But it is the stock of already-issued shares and bonds, which as retradable monetary instruments are easily valued – their problem being one of a price which shifts at the very moment rather than being indeterminate or non-existent at any moment.

The heterogeneity of capital, once it encompasses production equipment and technologies as well as sums of money, may defeat any attempts to put a price on it. The ‘transformation problem’ provoked a century-long computational conflict for those seeking to link prices to inputs of capital and labour. Capital valuation has proved no less divisive, with analytical objections to forward- and backward-looking approaches and a distinct mistrust of present prices when capital markets are so capricious.

Out of stock?

With war and the Great Depression behind them, Keynes’ followers set about extending his analysis into the long term. But they immediately ran into the obstacles presented by investment’s supply-side effects – its tendency to cause (and then react to) changes in the value of the existing capital stock. The consequent capital gains and losses could generate income change without any corresponding production activity, a disruption to macro theories based on ‘circular flow’. A capital stock that revalued or devalued with every change of interest rates became a flimsy foundation for analysis, when changes in interest rates were central to new policies for keeping economies stable.

The mainstream that Keynes had challenged meanwhile restored itself to orthodoxy, with advances in general-equilibrium theory that seemed to bridge the micro–macro divide. Any fallacies of composition or circularities of reasoning, in determining the interest rate and the aggregate capital stock, were resolved by all emerging from marketplace bargaining (*tâtonnement*) simultaneously. To restore the time dimension largely missing in general equilibrium, mainstream theorists also built their own account of long-term development, the neoclassical growth model, based on an aggregate production function in which capital and labour combined to generate national output.

Today’s resilience of the aggregate production function belies its troubled history. Fifty years ago, its developers actually conceded the weakness pointed out by post-Keynesians: a seamless (and shameless) transition from real inputs and outputs to financially measured, fungible ‘capital’ calculated using the rate of return that it then went on to explain. But their admission of circular reasoning (Samuelson 1962, 1966) was the magnanimity of pedagogical victory. The aggregate production function still dominates neoclassical explanations of

growth and income distribution, with an analytical usefulness that trumps any challenge to its operability or realism. A basic $Y = f(K, L)$ now supports hundreds of empirically fruitful variants in which contributions to growth are probed by separating different elements within K or L , and different parameters are explored to 'fit' the function to recorded growth patterns.

Even the warning from another generation of Cambridge theorists – that the use of prices to value stocks makes the aggregate production function an accounting identity, nullifying any demonstration of its close fit to empirical data (Felipe & McCombie 2001, 2006) – is politely brushed aside. In response to the Cambridge critique and other challenges to the assumptions behind the perpetual inventory method (PIM), some economists did (more than 50 years ago) develop an alternative that measures flows of capital input, so that problematic stocks of aggregate capital need not be invoked (Griliches & Jorgenson 1966, Jorgenson & Griliches 1967). Their lead has not been widely followed. The conditions for a 'well behaved' production function turn out to be so strict as to push an already dismal science into heroic levels of discipline. But they are still assumed to prevail, probably because of the scale of theoretical and empirical work that any admission of tautology would bring crashing down.

For those post-Keynesians who drew attention to the problems of measuring and modelling an aggregate capital stock, the principal (and principled) solution has been to rebuild the subject without it. Macroeconomic data had, steered in part by Keynes' Cambridge followers, already become focused on national *income* accounting, with stocks of national wealth not regularly surveyed before the 1980s. Corporate accounting likewise concentrated on current operations recorded on the income statement, whose effects were then transmitted to the end-of-year balance sheet. So having highlighted the circularity of any capital measure that derived 'present values' from a 'rate of return', theorists in the Cambridge (UK) tradition began building macroeconomic models that do not require a stock of capital.

Capital still enters the production process in such models – but only as an input, alongside the fuel and raw materials that businesses convert or use up. Working capital is absorbed during the production cycle. Fixed capital is still there at the end, but its durability comes from being reconstituted during every production cycle, emerging as a 'joint product' alongside all the other outputs. 'Capital goods, of whatever nature, can be considered as inputs into the production

process at the beginning of the year and as outputs at the end. . . . Those that outlast the yearly period of the production process, to be reused in successive years, are considered as products jointly produced with the final goods . . . all the elements of the analytical scheme are reduced to flows' (Pasinetti 1980: xiii). Capital becomes comparable to a catalyst, which joins in a chemical reaction but emerges with its structure unchanged, while sometimes changing in state (between solid, liquid and gas).

Saving represents a reallocation of consumption across time. Resources are put aside now so as to be available later, not necessarily with an expectation of their being increased in real terms. Investment is a sacrifice of consumption now with the intention of allowing *more* consumption in future. But with payments deferred via credit from banks or capital markets, investment is reconfigured as protracted consumption. The pursuit of a (positive) return on investment is conventionally assumed to make investment a riskier strategy than saving. The saver sacrifices an opportunity to augment consumption in real terms, but avoids the risk (which investors run) of losing some or all of the resources not consumed now.

The reformulation of mainstream (neoclassical) ideas into 'general equilibrium' makes it possible to dispense with stocks and to abstract from time (or at least from its directionality). So the mainstream, too, can avoid any perils of stocktaking when explaining national income determination. The economy becomes a system of flows, brought into equilibrium by price, wage and interest-rate flexibility. The reconceptualization of capital as an input that reappears as joint output permits a similar economy of flows, untroubled by expansion, erosion or revaluation of a stock. Theories of growth can focus on the flow of most concern – national income per capita – without being distracted by accounting for intervening stocks.

Consensus among contrasting versions of economist always brings calm before a storm. When economists go with the flow, five outrageous propositions (OPs) emerge.

OP 1: Investment does not necessarily add to the monetary value of the capital stock

Investment is the expense of repairing, replacing, rearranging or enlarging the various types of capital that enable production. It is

expenditure without immediate income that (in aggregate) matches saving, which is income without immediate expenditure. Although it changes the capital stock, there is no presupposition that investment raises the value of that stock (whether calculated by historic cost, present market price or expected future profit).

The possibility – even likelihood – of investment leaving capital stocks unchanged or reduced has already been floated among numerous critiques of backward-looking capital aggregation. The PIM assumes that gross investment adds to the stock while depreciation and obsolescence subtract from it – not recognizing that investment can drive depreciation by changing the income distribution and can drive obsolescence by introducing new technologies. The PIM also uses a price index of capital goods to bring past investment expenditures up to present value, not acknowledging that present investment might upset the past technological relationships that the price index captures. The use of present discounted values assumes future income and expenditure flows, and a discount rate, which can change as a result of the investment or of relative price changes that also affect investment. A stock's present market price is as likely to be lowered as raised by further investment, when it supersedes or supplements what is already there.

As befits its close links to innovation, investment relates to the stock of capital much as scientific research relates to the stock of knowledge. It can add to what is already there (as does much of the 'normal science' depicted by Kuhn 1962). It can add to the value of what is already there. But it can also force a reappraisal that devalues or invalidates what is already there. Sometimes a new contribution sweeps away many old contributions, leaving less still-valid knowledge than what existed before. A 'pessimistic induction' suggests that, just as many once widely held scientific ideas have now been rejected or confined to special cases, much of what today is held to be true will tomorrow be demolished or greatly devalued (Stanford 2006). The same consequences can flow from any act of investment, more so as research and development (R&D) becomes included in this measure. The larger the existing stock (of knowledge or of capital), the greater the potential destruction wrought by any new capacity or knowledge that arrives. At times of new technological discovery, expenditure on new capital equipment is particularly likely to devalue the old, though whether it accelerates the scrapping

of this is much dependent on incumbents' and new entrants' relative market power.

The unpredictability of surviving capital stocks after new investment flows is highlighted by the vexed debate on 'capital saving'. If innovations in (and/or mass production of) capital goods brings their prices down, then there can be steadily more 'real' addition to capital stock from any given flow of investment. In principle, a cheapening of capital goods should lead to more expenditure on them, reflecting an 'income effect' from their lower price in relation to other goods and a 'substitution effect' from their lower cost in relation to labour. But a cheapening of capital goods can still lead to a lowering of subsequent investment spending because more new (or upgraded) capacity can now be bought for less. Investment is, by definition, needed to maintain a capital stock that wears out or obsolesces over time. But this does not have any implication for the value of that stock through time, nor does it lead to a clear measure of 'net' investment that can be associated with increase in that stock.

OP 2: A rising capital stock is not necessary (or sufficient) for growth

If investment can leave capital stocks unchanged, or even reduced, while generating economic growth through the Keynesian 'flow' process, it follows that growth can be achieved without adding to capital. The World Bank's (2006) research on higher-income economies suggests they were doing this. There was steadily rising productivity from an existing capital stock – or from a capital stock whose value was static even if its composition was changing. Investment might have been driving the growth in per-capita GDP, but it had ceased to do so through the intervening step of adding to productive capital.

How can economies keep growing if their capital stock has levelled off? Four main explanations have been offered, listed here with the most optimistic first:

- (1) Innovation and ingenuity, continually raising capital productivity, can allow production to keep growing without further adding to the capital stock.
- (2) Investment keeps adding to the physical capital stock, and this is still the source of growth, but a cheapening of capital keeps the value of the expanding stock unchanged.

- (3) Capital continues to grow, in physical as well as in monetary terms, but is now added in ways that are not detectable. New capital takes the form of intangible and intellectual assets that are not (currently) measured in national accounts.
- (4) Capital has indeed stopped growing, and because of this there is no 'real' growth in the economy. Recent 'growth without capital' has been an illusory consequence of monetary expansion and misguided investment. Debt has grown on the mistaken assumption that there is capital to secure it against; there will be recession, financial crashes, inflation and/or massive debt write-offs when investors realize the 'hole' in the economy where the capital should be.

The first two explanations are the most encouraging, and collapse into one when it is accepted that additions (or non-additions) to the capital stock can only be meaningfully discussed when capital is given a monetary value. According to this view, it is natural and reassuring that 'productive' capital (plant and machinery) forms a small and diminishing fraction of the total in a modernizing economy. Economic development is characterized by expansion of producer-goods production, and technical innovation to drive down their cost. This increases the physical productivity of capital – units of output for a given input. A given investment expenditure will therefore contribute to expanding physical output without the need for a larger capital stock to produce it, or even for a higher money income to buy it.

It is possible to imagine capital saving in purely physical terms, as an innovation that allows fewer natural and human resources to do the same job. A wireless transmitter carries the same signals as the old wired assembly and saves on wire (Field 1987: 475). A mechanical digger might do the same work as 500 labourers with shovels, while requiring only 1 operator and the metal of 250 shovels. But such comparisons are fairly meaningless unless monetary values enter the account. Even if the wireless transmitter is simply the old transmitter without the wires, the price (and replacement cost) of its components will change over time, and the value placed on it will be more than the sum of those costs. Melting-down half the shovels to make a mechanical digger (even if physically possible) would not restrict the value of the digger to that of half the shovels. If it did, the biblical ambition of refashioning swords into ploughshares would lose much of its significance.

Capital saving is more clearly comprehensible as a reduction in capital cost per unit of output, or a rise in capital productivity. This can be achieved by reducing the cost of financing capital expenditure (cost of capital as defined by financial economics) and/or by reducing the cost of capital goods (enabling more to be bought with a given expenditure). Economic history tends to suggest that reduction in the cost of capital *goods* has been the main source of capital saving. Machinery specialized to one process attains a wider sale as more firms adopt that process, so that it can be batch produced (or even mass produced) and its production costs come down. Alongside these there emerges a range of 'general purpose technologies' applicable to many processes, allowing them to be made on a large scale. Computers, motor vehicles and electric motors are among those that generalize to an extreme degree, being adaptable to specific tasks after they have rolled off a mass production line at very low unit cost. Over time, more of these – each with greater capability than earlier models – can be bought with a given capital budget. The falling cost of capital goods, along with their rising productivity, means that financial 'capital intensity' can appear to fall even when physical 'capital intensity' appears to be rising and capital is substituting labour.

This cheapening of capital goods – giving business investors more additional output for each investment outlay – may be essential to counteract rising 'externalities' associated with private investment. As well as the formally calculated costs of equity and debt, businesses incur additional internal cost when investment disrupts existing relations with employees, managers, suppliers and customers who are happy with the status quo (Christensen 1997). As well as any benefits to the firm, investment can confer benefits on the wider economy by boosting demand, developing or trying out new technologies, testing for the existence of untapped markets. While one firm's investment often reduces the return on competitors', eroding the value of their new or existing capital, it can also boost the productivity of complementary producers' capital and add to the utility of users (especially of 'network technologies'). Additional internal costs, and inability to capture external benefits, may keep private investment below what is socially desirable; so a rising 'productivity' of investment expenditure, enabled by rising productivity of the goods and services it buys, may combat a tendency to under-investment in an increasingly privatized and interconnected economy.

OP 3: Investment drives growth, regardless of its impact on capital

Investment is identified as a key determinant of short-run growth in the Keynesian circular-flow analysis. This contribution is readily extended (theoretically and empirically) to the longer run. But perhaps because Keynes departed after helping to create the post-war framework for growth, without extending his analysis to it, earlier macroeconomic traditions prevailed in the longer run.

Growth accounting, based on neoclassical (and more recently post-neoclassical) theory, has tended to identify rises in total factor productivity as the biggest contributor to GDP growth, outweighing increases in the quantities of capital and labour. By identifying Japanese (and general East Asian) growth as largely 'extensive' (deploying more of the factors) rather than 'intensive' (raising their productivity), Krugman (1994) was able to foresee the sudden slowdown in Japanese growth less than two years after it started happening. The primacy of factor productivity in generating growth is also consistent with the World Bank's (2006) discovery that rich-country growth can still proceed in the absence of much saving and investment.

However, it makes little sense to downplay investment as a cause of growth, and shift the focus to factor-productivity gain, if investment is essential to raising total factor productivity. The traditional focus on investment as adding to capital, and extra capital as contributing to growth, has distracted from the possibility that investment promotes growth while adding nothing to the capital stock (or even subtracting from it). The link between investment and growth will always be obscured if 'investment' is taken to include expenditures other than those on plant and equipment. Although investment is (by accounting definition) equivalent to saving, the flow of saving into real estate, precious metals and second-hand stocks can only have a very indirect effect on production, so the measured connection between saving and growth will necessarily be loose.

The link between investment and growth will also be obscured if investment is assumed to build up a stock of capital, which is then (perhaps through a production function) assumed to determine the aggregate output. As observed in Chapter 4, the 'perpetual

inventory method' and other schemes linking present productive capital to past investment has to make optimistic assumptions on the efficient and error-free allocation of that investment, as well as on the depreciation rate and useful lifetime of the equipment installed. If we want to know how investment affects output growth, it makes more sense to focus on investment in equipment that generates output and on the statistical association between this form of investment and growth. Fortunately, this simplifying step was taken a quarter of a century ago. The role of investment as the driver of growth, without any appeal to the stock of capital, emerges clearly from the extensive empirical work launched by DeLong and Summers (1992, 1994).

Looking directly at the association between investment and growth, outside the constraints of a growth-accounting framework, DeLong and Summers (1991, 1992) found a very clear and durable connection. National output rises when there is a rise in real investment, in both the definitions commonly given to 'real': investment in new productive capacity (as distinct from 'financial' investment in securities representing claims on existing capacity) and increase in investment through either a rise in the outlay or a fall in prices of the equipment it is spent on. 'Rapid growth went with high equipment investment no matter whether high equipment investment was a consequence of high savings or of a low relative equipment price' (DeLong & Summers 1992: 1–2). Using a sample of 61 countries in 1960–85, DeLong and Summers found that every 3–4% rise in equipment investment was associated with a 1% rise in per-capita GDP (DeLong & Summers 1992: 6).

Equipment investment is emphasized in the conclusions of these studies because non-equipment investment, separately identified in these regressions, had an insignificant effect on per-capita growth. Growth is associated with the flow of new equipment items resulting from investment expenditure, not just the flow of expenditure – a distinction achieved by including countries' average equipment prices as well as their annual investment spending. So faster growth can be achieved by bringing down the cost of new equipment as well as by increasing the flow of investment spending. DeLong and Summers also suggest that equipment investment remains a key driver of growth at all stages in a country's development, by showing that its importance is no lower for a subsample of 25 high-income economies than for the full sample of 61.

The focus on equipment investment and the inclusion of different equipment price indices for each sample country go a long way towards explaining why DeLong and Summers find a strong link between investment and growth, even in the richest economies, when the World Bank (2006) found that the link between saving and growth breaks down above a certain per-capita income level. The DeLong and Summers (1992) definition of ‘investment effort’ – current consumption foregone – is operationally the same as the World Bank’s (2006) definition of ‘genuine saving’, which equates to net investment. In the basic World Bank approach,

$$\underline{C}(t) - C(t) = \mathbf{p}(t)\mathbf{I}(t)$$

where $C(t)$ is the present-period consumption, $\underline{C}(t)$ is the discounted present value of all future consumption, $\mathbf{I}(t)$ is the current-period net investment, and \mathbf{p} is a vector of capital-goods prices (Ferreira & Vincent 2005: 738).

By focusing on saving, the World Bank does not distinguish savings that flow into ‘productive’ industrial equipment investment from those that flow into ‘unproductive’ personal investments (in property, precious metals, etc.). The World Bank also implicitly uses one index of equipment prices for all countries, ignoring evidence that ‘different countries have radically different price structures. The same foregone consumption purchases three times as much machinery and equipment in post-WW2 Japan as in post-WW2 Argentina’ (DeLong & Summers 1992: 4). Critics pointed out long ago how the perpetual inventory method, which the World Bank uses for its physical-capital calculation, assumes the efficiency of investment at different times and in different places to be uniform, and uniformly high (Ward 1976).

The link between growth and actual investment (i.e. amount of new equipment purchased), rather than investment effort (amount spent on new equipment), suggests that the role of investment goes further than merely its addition to aggregate demand – the focus of early ‘Keynesian’ growth theories such as Kurihara (1959). Investment also makes a ‘supply side’ contribution, which varies with the amount of equipment purchased and the efficiency with which it is installed and used. But this contribution does not depend on what investment does to the monetary valuation of the capital stock.

Investment – defined as expenditure intended to generate a stream of future income – is needed whenever existing productive resources

are rearranged and reconfigured, or new ones added. The intention of such rearrangement is to raise the total *prospective* value of the capital stock – the present discounted (expected) value of future income it will generate. The capital stock's historic value, as measured by the perpetual inventory method, could be raised, lowered or left unchanged by the flow of new capital spending. What matters is the flow of gross investment and the amount of productive equipment this investment flow can buy.

Theoretical underpinnings for this conclusion are provided by Scott (1989), who defines investment as 'the cost of changing economic arrangements' (1989: 94) and argues that technical progress depends on such change. Gross investment is the relevant measure, since technical progress achieved through rearrangement necessarily makes much existing capital obsolete. As obsolescence is the major cause of capital's depreciation, subtracting that depreciation from gross investment (to get net investment) will seriously understate investment's contribution to growth. At the extreme, investment in new techniques which lead to the scrapping of all existing machinery, and its replacement by more productive alternatives, would show up as zero 'net' investment, with the entire rise in productivity being ascribed to technical progress. With primacy assigned to gross investment, the distraction of depreciation is avoided, and the problems of accurately measuring obsolescence rates, equipment lifetimes and scrapping no longer undermine the analysis.

OP 4: Saving does not drive investment (or growth)

The proposition that saving drives investment was, in principle, demolished in the 'Keynesian Revolution' more than half a century ago. According to the 'loanable funds' theory, the flow of saving per period is needed to finance the flow of investment per period, and the interest rate adjusts to bring the two into balance. If households choose to save more at any interest rate, the equilibrium interest rate will fall, and more will be invested at the new equilibrium rate. Keynes (1936) highlighted the decline in aggregate demand that would occur if households saved more of their income and the likelihood of lower demand reducing firms' intended investment, causing $I = S$ at a lower level of employment and output. Post-Keynesian theory has more explicitly reversed the loanable-funds approach, arguing that investment determines saving through its impact on national income.

Without any theoretical need or any empirical way to demonstrate that saving precedes investment, the way is open for a wholly different interpretation of the macroeconomy in which investment determines saving, maintaining their equality via budget constraint.

Even in neoclassical growth models, the rate of growth is independent of the rate of saving and is ultimately determined by the availability of new 'factors' on the supply side. Higher saving will generate more 'capital intensive' growth, with a higher capital-labour ratio, but not faster growth (except over a short period when the saving rate initially rises). In effect, economies can achieve the same rate of growth with different capital intensities, and those requiring a larger capital stock (per unit of labour) also require a higher saving rate. But the higher flow of savings is needed to match the larger amount of equipment, skills, and so on requiring repairing or replacing and does not make any difference to the growth rate of output to which that capital contributes. In a possible human parallel, some runners may be taller and heavier than others, and require a bigger 'maintenance' diet, but this does not (on its own) enable them to run any faster. Recent medical research suggests that the accumulation of excess sugar in fat cells may be the cause of expanding food intake, not the effect (Ludwig & Friedman 2014).

Despite substantial objections to the argument that saving precedes investment, the idea of economic disturbances arising from imbalances from 'excessive' or 'deficient' saving still makes influential appearances. These include the 'savings glut' with which this journey began. But the 21st century to date has demonstrated that savings do not automatically flow into investment, despite the sometimes sclerotic growth of financial intermediaries that claim to do this translation. Investment is planned by individuals and businesses on the basis of available opportunities and their expected future rewards, and effected if they can persuade the necessary shareholders and creditors. The financing of investment in the absence of savings was capital's original purpose. If, later, savings exceed what business investors need, they flow elsewhere, bidding up the valuation of existing assets in the absence of anything new.

OP 5: Investment does not require saving

A firm can invest, without any prior saving, if it can obtain a bank loan or issue tradable debt. The ability of banks to lend by crediting

funds to the borrower's account, without needing to match this with savings previously deposited by other customers, is now generally accepted – by central banks (McLeay et al. 2014) as well as modern monetary theorists (Werner 2002, Wray 1998). Debt can be placed provided its buyers are assured that it will ultimately be repaid (with the promised interest), and that they will be able to retrade it (at a price commensurate with that interest) if they need to regain liquidity before the debt matures (Kiyotaki & Moore 2001). Loans to larger firms are secured not on individual projects but on the enterprise as a whole – a bundle of assets that includes human capital, goodwill and other components of the firm's market value that cannot be carved out for specific valuation or sale. More significantly, debt can be secured against the firm's *future* assets or against the income it expects to obtain as a result of the investment that the debt will finance.

Firms' borrowings are often, in practice, secured against assets that they own and are already in place. It could be argued that this indirectly matches loans to past saving – making them, in effect, a remortgaging of (or equity withdrawal from) earlier investments for which the firm must have 'saved up'. This may eventually allow all debt-financed investment to be traced back to an original act of saving. It is usually only the smallest start-up borrowers who are forced to offer a specific asset (such as the home they live in, or intellectual property they own) as collateral. In its absence, they often resort to financing initial investment through issuing shares, which (as will be argued below) does imply an initial act of saving in most cases. But this quest for a primordial act of saving, as the source of all investment funding, ignores the scale of subsequent borrowing while appealing to distinctly fuzzy history. It is comparable to the argument (developed especially by Nozick 1979) that the present distribution of wealth reflects distributive justice provided it results from a pattern of 'fair' past exchanges: pushing into the conveniently distant and indistinct past any initial transactions that might have departed from recorded history's model of fairness.

Individual households and businesses can invest without saving, if they can borrow to finance the investment (from a bank, or by issuing bonds and shares). Whole countries with closed economies cannot, it is conventionally argued, invest without saving, because some members' spending in excess of income must be matched by others'

income in excess of spending. Investment can exceed saving at the level of the whole country only if its economy is open and is able to attract capital inflows to finance the gap.

If some low-income countries save more than they invest, and allow the unused savings to flow abroad, there will correspondingly be some high-income countries that import the savings, enabling them to invest more than they save. This has been very clear for several decades in the case of the US and UK, whose investment rates have long exceeded their saving rates, an imbalance made possible by the inflow of other countries' savings. The benign manifestations of this inflow are the perennial surpluses of foreign direct investment into the countries' industries, attracted by their big domestic markets and/or favourable production conditions, and foreign portfolio investment, attracted by their efficient capital markets and legal and regulatory frameworks – giving high levels of protection for principal sums as well as reliable income streams from them. The murkier side is the inflow of capital seeking insulation from taxes and awkward questions about its provenance and ownership (Shaxson 2012). The incentive to hide personal and corporate wealth, and additions to them, leads to an understatement of private-sector assets (by up to 8% of the total according to the assessment by Zucman 2013) – an omission which if restored to national balance sheets would lessen the severity of present 'debt crises', especially in Europe.

Accountants' revenge: capital gains and losses

The economy of flows, understandable and manageable without reference to stocks, is an appealing foundation for policy with much to recommend it analytically. With expenditures linked to what can be produced and sold, and determining what asset stocks may be sold for, it roots economic activity in real operations rather than psychological evaluations. It is undermined, however, by the inescapability of sudden shifts in asset values, that set in train – but are not obviously derived from – 'objective' changes in present income or future profit flows. The monetary value of stocks can change without any impulse from economic activity, and the change can affect economic activity. In accounting terms, balance-sheet changes can send new flows through the income statement, as well as registering such flows.

Valuation changes triggered by enterprise-level events, or reassessment by a minority of investors, spread by self-fulfilling expectation to become a major source of shocks to the real economy. The world's economic problems since 2008 are easily understood as consequences of asset-price deflation (Eggertsson & Krugman 2012, Keen 2011: Pt 2, Koo 2008). A fall in asset values in a world where agents had only small capital buffers (relying for emergency liquidity on banks, market-makers or insurers whose equity is also very small) left significant numbers of traders struggling for solvency and liquidity, and unable to spend. Sharp drops in spending and lending worsened the fall in asset prices. Governments (and central banks) were forced to arrest the downward spiral by supplying the loans and making the expenditures that private sectors could no longer make available. Confronting catastrophic depression if asset-price deflation and debt deflation were allowed to continue, it became the role of government – regardless of ideology – to revive the value of private assets and reopen borrowing channels by substituting public for private debt.

Conclusion

Even if wealth and capital are defined as being equal, via the arguments reviewed in Chapter 4, they behave very differently as financial aggregates, leading to contrasting implications when they rise or fall in value. Wealth is an accumulation of saving defined as unspent income that represents a withdrawal from the 'circular flow' of income. It is the result to uncompleted transactions, in which people or companies have sold something (their labour or a product) and not spent all the proceeds on something else. In one period of time, saving not matched by investment can cause a deficiency in aggregate demand and an economic downturn (a proposition accepted even by non-Keynesians, whose case against Keynes is just that saving will convert to investment if capital markets are not restricted). Over time, the accumulation of wealth causes an escalating sequestration of spending power into the financial circuit, where it is channelled into (and bids up the price of) property and financial instruments. Demand deficiency is averted only by an expansion of credit: secured credit reducing net wealth by allowing the withdrawal of equity and unsecured credit enabling expenditure without current income to offset the savers' receipt of current income without expenditure.

7

Economies without Capital

If (as recent data seem to suggest) wealth has outgrown capital, capital's composition has shifted from equity towards debt, and public debt has expanded to rescue and replace the private sector's, what are the social and economic implications? Why does the power of capitalists, to concentrate national income and shape public policy, seem to grow as the presence of capital declines? The answers seem to lie in the imbalance between saving and investment flows that were examined in the first two chapters, but move in a different direction when confronted by the capital shortage suggested by the third.

Capital and its (re)valuation again

Capital is an accumulation of physical and human resources that can generate output and income over time. It is the result of extended transactions, involving present activity leading to future income generation which is financed by money obtained in advance of that income being maintained. If investment is structured (and succeeds) so that streams of debt repayment run roughly parallel to streams of income receipt through time, it need not involve any sales arising earlier or later than expenditure of the resultant income. So it need not represent any withdrawal from the circular flow. If investment is not structured this way, and instead involves expenditure ahead of any production and income receipt, it causes a net injection to the circular flow, as in the simple Keynesian model.

For savers who buy corporate equity, there is in principle no difference between income (if the company pays dividends) and capital

gain (if the company reinvests distributable profit and its shares rise in value). If the intention is to keep saving, such distributions will be channelled into new share or bond purchases: the same amount will be added to savings, and the only question is whether the company or the individual shareholder controls the reinvestment. Taxation on dividends and lower tax rates for capital gains than for income can create a bigger difference and push preferences towards reinvestment. Companies have increasingly sought to overcome this by buying back shares instead of paying dividends. But if individuals prefer to receive the income (giving them a choice of where to reinvest) rather than restricting reinvestment to this one company, their pre-tax preference will be for distribution, and the higher tax on distributions may merely be restoring savers' indifference.

However, from a whole-economy viewpoint the receipt of income may have very different implications from the receipt of a capital gain. The marginal propensity to consume from capital gains has generally been found to be positive, but smaller than that from earned income, and highly variable across countries (e.g. Bhatia & Mitchell 2010, Bover 2006, Dvornak & Koehler 2007). When capital gains are on housing, their macrolevel effect on consumption may be partly offset by a fall in tenants' consumption propensity as they anticipate higher rents (Guiso et al. 2005). Low (and occasionally zero) propensities to spend more when wealth increases can easily be related to 'permanent income' theory, if asset values are viewed as volatile so that gains are liable to reversal. But it is possible that the propensity to spend is greater when asset appreciation brings the opportunity for equity withdrawal, because in a credit-constrained world the rarity of such chances to borrow means that holders of wealth (especially houses) seize them when they can.

Whether a low propensity to consume from capital gains means a muted effect on aggregate demand depends on how large the gains are, and how widespread. Thurow (1975) long ago drew attention to the disproportionate role of asset revaluation in creating personal fortunes. Overnight changes in asset values can add more to individual and household wealth than a lifetime spent chasing promotion and saving out of work income. The goal of 'asset-based welfare' is to equip everyone with a portfolio that can raise overall income faster than work income, and keep it flowing if work ceases. But this presumes that assets are widely held and that their appreciation

brings capital gains for the whole economy, not just a redistribution within it. If assets are unequally distributed, or if appreciations are confined to the asset class held by a minority, appreciations are likely to worsen existing inequalities in wealth and income distribution.

The changing value of changing value

The damage done by asset-price changes – appreciation worsening wealth inequality, depreciation causing deep and intractable recession – has encouraged numerous efforts to restrict capital gains and/or to ensure that they are shared across all interested parties. Such restrictions were built into the Bretton Woods system, and the 25 years of its effective operation (1945–70) remain a probably unique interval between serious financial crises (Qian et al. 2010). The pre-1970 era was characterized by numerous defences against capital appreciation and depreciation, across the countries of what became the OECD. Fixed exchange rates minimized the relative price changes that could shift the value of export-oriented firms and their shares. Mortgage-lending restrictions limited the leverage that could amplify fluctuations in real-estate prices.

Once direct or indirect curbs had been placed on asset-price changes, the incentive to speculate on these was greatly curtailed, even where such speculation was not explicitly discouraged. Big bets on changes in asset prices were confined to situations where a valuation had become so obviously incorrect that previous limits on revaluation or devaluation would have to be relaxed. The most obvious instances were with exchange rates, but even when a country's widening current-account deficit and drainage of reserves meant a currency devaluation was imminent, exchange controls and betting restrictions usually prevented a build-up of speculation that would disrupt the timing of the realignment or enrich private traders. Once the Bretton Woods arrangements broke up, only a few of the larger economies were able to maintain rules at national level that restricted asset-price changes.

Germany has often been offered as an example of a country institutionally adjusted to restrict asset appreciation. Rent restrictions and other protections of tenants' rights limit the appreciation of residential property prices (and keep the population roughly balanced between owners and renters, so that policy does not become

weighted towards one group). Real estate is an especially important target for asset-price stabilization, because its value is capable of moving (and destabilizing) in either direction: appreciation causing macroeconomic upset through income redistribution, depreciation through balance-sheet damage and negative wealth effects.

Changes in industrial asset valuation are, arguably, less damaging, because movements in either direction can have some upside: depreciation promoting replacement investment, appreciation raising share prices and promoting expansionary investment through lower capital costs. But such movements can still create and exacerbate a business cycle, so the German approach also stabilizes industrial asset values. Appreciation is curbed by forcing shareholders to co-determine strategy with other corporate ‘stakeholders’ and by preserving barriers to the hostile takeover bids that can cause sudden jumps in share values. The consequences of Germany’s institutional curbs on asset appreciation are confirmed in the survey evidence of Table 7.1, which shows the median household’s wealth position in Germany to be modest compared to those in countries with comparable or lower per-capita GDP. This is also consistent with the German ‘wealth gap’, pushing its ratio of wealth to national income around on hundred percentage points below EU comparators, reported by Piketty and Zucman (2013a).

Japan is often cited as maintaining cultural values which force contractual renegotiation when asset values suddenly change, so that buyers agree to pay more if the value increases before they

Table 7.1 Asset holdings: median household, 2013 (EUR thousands)

| | Germany | Spain | France | Italy | Netherlands |
|-------------------------------|---------|-------|--------|-------|-------------|
| Real assets ^a | 89.2 | 201.7 | 124.1 | 176.0 | 198.8 |
| Real estate | 180.0 | 209.6 | 210.9 | 200.0 | 240.0 |
| Financial assets ^b | 17.1 | 6.0 | 10.7 | 10.0 | 34.7 |
| GDP per capita ^c | 124 | 95 | 108 | 98 | 127 |

^aIncludes business wealth, valuables and vehicles

^bIncludes bonds, shares, deposits, private pensions; excludes public and occupational pensions

^cEU28 = 100

Source: ECB (2013) Tables B2, C2; Eurostat (2014) GDP per capita in PPS.

take delivery and sellers accept a lower price if the value decreases before payment is received. The derailment of Japan's long boom in 1990 began with a fall in asset values so large that such burden-sharing, rather than sparing all stakeholders, dragged them all down. It is possible that assurance of the sharing-out of capital gains and losses encouraged firms and households to let them happen, until they reached unsustainable proportions – a moral hazard that first promoted industrial growth, but later encouraged stock-market and real-estate speculation. Islamic finance, requiring investors to accept a share of ownership and take their income as profit or rent, can be viewed as another way to ensure a sharing of risks among traders, avoiding a big redistribution of wealth from losers to gainers when an asset is revalued.

Despite their apparent advantages for individual economies, it is unclear whether the advantages of curbs on asset-price movements could be generalized if more countries adopted them. Germany and Japan long stood out as the only large high-income economies whose saving routinely exceeded its investment, causing persistent current-account surpluses despite frequent public-sector deficits. Japan's external surplus eventually waned as its ageing population drew down on savings, leaving Germany's combination of (im)balances unique in the northern hemisphere and uniquely disruptive to the Eurozone. Germany's prolonged excess of saving over investment is often ascribed to its culture and industrial structure – fear of inflation, distrust of borrowing (even for home purchase), a flow of cheap domestically produced capital goods that enables a small amount of investment to add a large quantity of capacity. But German culture is not radically different from that of neighbouring countries and maintains great similarity to that of other 'Anglo-Saxon' countries with radically different patterns of economic balance and performance. The difference appears to arise far more from institutional than from cultural or structural factors, which are more effects than causes of a particular regulatory choice.

Depreciation of capital results from relative price changes that cause a redistribution of income from capital to labour. This makes it a microeconomic process, experienced at the level of individual enterprises and wealth-holders; there is no capital depreciation for the economy as a whole. 'For example, real wages rise and so an employer suffers thereby a loss of profits and wealth' (Scott 1989: 20).

As it represents a fall in the valuation of the capital stock, depreciation is analytically distinct from wear and tear on capital in use, which results in a physical erosion of the stock. This erosion diminishes capital's output- and income-generating potential for the whole economy, so represents loss of income for the macroeconomy unless offset by maintenance expenditures to keep capital intact.

By the same process, asset appreciation causes a redistribution of income from labour to capital. Capital gains are received, and reinvested, in proportion to the capital already held. Although keeping real interest rates persistently low (in the decade-long 'great moderation' before 2008 and for a comparably long time afterwards) was supposed to spell euthanasia for the rentier, it did more to instil euphoria. The low borrowing cost ensured lasting capital gains, especially on assets purchasable with leverage, made more attractive by tax advantages compared to other forms of income. Although the return on financial investment (r) stayed low, growth rates of the real economy (g) sank even lower. This maintained the $r > g$ which enriches the already rich (Piketty 2014) and which (as will be seen below) tightens the debt constraint on governments, impeding their social support for (and honouring of entitlements of) those without wealth.

However, to conclude that economic success lies in stabilizing real estate and financial-asset values is to assume an improbable separation between the 'financial' and 'real' economies. Sudden revaluations are not inimical to market economies. They are the essence of the competitive process, with most entrepreneurs only motivated to set up businesses (and most businesses only motivated to keep investing) by the anticipation of acquiring assets that will jump in real value. Eliminating capital gain means settling for a society of salaried corporate or public-sector bureaucrats – the 'other-directed' nightmare scenario briefly glimpsed in the post-war US by Riesman et al. (1950), and quickly averted by incentives (including relaxed bankruptcy procedures) for mid-career executives to quit the big firm and start their own. Sudden depreciations are the means by which outmoded capital stock is cleared away and investors' funds recycled from failing enterprises to ascendant ones. Depreciation occurs as quasi-rents from past investment are transferred from firms to their employees (Scott 1989: 20–30), and spurs the firm to invest again in pursuit of new capacity that restores those rents.

The necessity (for capitalism) of asset-price changes applies to shares and bonds issued as entitlements to the profit from industrial enterprise, as much as to the physical, human and intellectual capital which the enterprise encloses (and against which its shares and bonds are issued). Looking again at Table 7.1, the biggest 'deficiency' in German wealth (compared to European peers) arises with real business assets, not real estate or financial assets. Any success there in capping the rise in property and other equity values has not been rewarded by a stronger rise in direct holdings of 'productive' business capital. The more likely result is that Germans have invested more in industry so as to *reduce* its capital requirements, delivering their superior per-capita national output with an ever smaller stock of physical, human and intellectual capital inputs.

The other Moore's Law

The inescapable link between product and asset markets, and between capital gains (or losses) and the 'real' economy, was highlighted soon after the end of the Bretton Woods era in a long-neglected analysis by Basil Moore (1975). The distinguishing feature of societies founded on private property and free markets, Moore argues, is that all wealth is held in private-sector portfolios. The value of private wealth (as empirically measured, for example, in Table 5.3) will be set, like that of any commodity, by supply and demand. Wealth 'supply' is determined by the stock of existing assets and financial instruments issued to finance them and by households' lifetime income, all of which are determined by national output and its growth rate. Wealth 'demand' is set by households' savings behaviour, relating to their life-cycle plans and desire (if any) to leave bequests.

To allow portfolio diversification, households will prefer to hold financial instruments issued by businesses rather than own businesses directly. And as corporate bond holdings are assets offset by liabilities elsewhere in the private sector, households' net wealth will mostly take the form of corporate equities. In contrast to wealth, a purely financial aggregate, capital is a stock of money and real equipment, whose accounting value is determined by costs of replacement. There is nothing to force wealth (W) determined by equity markets to be always equal to capital (K) valued at replacement cost. The valuation ratio of W to K can move above or below 1.

Unshackled by any assumed equality or interchangeability of wealth and capital, Moore takes the Keynesian approach that capital formation will be driven by business assessments of future revenues and investment-financing costs and will not be determined or constrained by households' supply of savings. If households decide to save more, they will just inflate the price of the assets on offer, raising the value of wealth and the valuation ratio W/K . 'Saving represents the demand to accumulate assets, and these may be provided by real capital accumulation or by the revaluation of existing assets' (Moore 1975: 876). A single sentence dispels the mystery of the pre-2008 'global savings glut'. Savers wanted more real assets to hold but, as businesses were not investing enough to create them, their additional savings flow pushed up the value of existing assets instead.

If capital gains are realized and paid out to household-shareholders as income, they will be mostly spent, reflecting households' generally modest saving rate and high propensity to consume. But most capital gains are not paid out, remaining on firms' balance sheet, where their empirically measured effect on household expenditure is very small. Rising wealth inequality will also reduce the impact of capital gains in raising expenditure, since it implies a concentration of shareholding among the wealthiest households, whose savings rates are higher than average. A high-net-worth elite, holding a disproportionate share of financial and real assets, may be another way to shield the economy from disruption by asset-price volatility. 'It is concentration of property ownership in addition to the capitalist ethic that make capitalism as a system such a powerful engine of accumulation . . . But one price is the very considerable inequality of income and opportunity, which could be reduced by the differential taxation of property income, or by the collective ownership of property claims to society's real wealth' (Moore 1975: 885).

Moore's model also helps to explain the rising ratio of wealth to national income, whose persistence after the financial crash puzzles and upsets those who thought that an asset depreciation would (or should) hit the biggest portfolios hardest. An increase in wealth relative to national income (and the value of capital that contributes to national income) is a normal outcome of post-crash saving and investment behaviour. Investment falls because businesses cannot raise much new funding from a wounded banking system, have less profit to reinvest because of slacker demand, and anyway have

lessened incentive to invest because customers' incomes (and inclination to spend them) have fallen. Saving intentions rise, because households and businesses have suffered balance-sheet damage that they need to repair. The consequent increase in (W/K) is, in accounting terms, equivalent to a rise in $(W/Y) \cdot (Y/K)$ or $(W/Y)/(K/Y)$, the wealth-to-national-income ratio divided by the capital-to-income ratio. A rise in the wealth-to-income ratio is inevitable, unless the ratio of income to capital (Y/K) also rises. Such a rise in capital productivity is unlikely when national output and investment are cyclically depressed.

One social implication of Moore's model is that income inequality generates wealth inequality – reversing the often-presented link between the two inequalities. It is because a subsection of society receives very high work-incomes that they demand a lot of assets, bidding their prices up – and it is this which drives up the economy's wealth-to-income ratio, as charted a generation later by Piketty (2014). Whereas Piketty tends to imply that inequality's upward spiral begins with rentiers who reinvest their unearned income, it is equally possible that the disparity among individuals starts in the workplace and transmits rapidly into wealth holdings – the *nouveau riche* quickly eclipse any leftover aristocrats.

An equally striking implication is that a rising valuation ratio, which is stock markets' reflection of a rising wealth-to-GDP ratio, does not necessarily deliver the social gain of higher investment and growth to offset any social damage from worsening wealth inequality. Conventionally it is assumed that a rise in the valuation ratio lowers the cost of capital, induces firms to make more real investment, and so promotes GDP growth. This raises average real incomes and also restrains inequality, by improving wage workers' earnings opportunities while pushing down financial-asset prices (by creating more of them) and so offsetting some of the rentiers' capital gain. But a countervailing mechanism is now revealed. The increase in wealth (capital gains) signalled by a higher valuation ratio will push up the interest rate – since this is the 'bribe' that must be paid to the better off to keep their wealth saved and not spend it (or at least the increments to it) in a way that would cause inflation. The higher interest rate raises the hurdle rate of anticipated profit that a project must yield before a business will invest in it. This partly offsets the fall in costs of capital due to higher valuation: financial-asset demand is

thereby propped up, while the supply of new financial assets through additional real investment is curtailed.

Here, with wealth properly distinguished from capital, is an explanation for Piketty's (2014) otherwise puzzling claim of a very high elasticity of substitution between capital and labour, which prevents the return on capital falling as more capital accumulates. The durably high return actually relates to wealth, arising because of reinvestment and the escalating price of a restricted financial-asset stock, rather than to capital, which is misleadingly equated with wealth. Whereas Piketty (2014) argues that an excess of the rate of return on wealth (r) over the real GDP growth rate (g) is a lamentable trigger for a widening wealth gap, $r > g$ is actually a precondition for a private-property economy growing rich.

The rediscovery of ownership

In contrast to systems that limit the movement in asset prices, or share the gains and losses from such movement, the US and European economies allow private owners to absorb them all. Therein, according to its advocates, lies much of the dynamism of 'Western' economies in advancing new technologies, and their resilience in bouncing back when investors' reach temporarily exceeds their grasp. The prospect of getting rich quick, by turning an idea into a business worth millions, ensures continual innovation and rapid diffusion of best practices. Equally dramatic downturns in the value of misplaced or superseded assets ensure the rapid transfer of resources from 'sunset' to 'sunrise' applications. In a world of generally falling corporate taxes, capital gains tax rates have dropped especially sharply in the Anglophone economies, on the assumption that the gains are a spur and the taxes deter.

The private-owner-takes-all principle is diluted only when public capital is put at risk. So (for example) when the UK government offered to top-up house buyers' down payments, as part of its 'Help to Buy' scheme to revive the housing market after 2010, it packaged its contributions as 'equity loans' so that it could take a share of any profit on resale. Where the capital subscribed is entirely private, any gains are left to be absorbed by private owners. The same was true of capital losses, until their absorptive capacity proved too small (and the effects of their exceeding it too great).

Private property rights have become the second cornerstone of mainstream economics, inseparable from the efficiency of free competitive markets in improving resource allocation and promoting growth. Empirical associations of stronger property rights protection with better economic outcomes (e.g. Guedhami & Mishra 2009, La Porta et al. 2002), following up the pioneering work of theorists citing historical and legal cases (e.g. Coase 1960, De Soto 2000) have encouraged international initiatives to define and strengthen such rights in pursuit of development. These range from rural land titling, designed to encourage farmers to invest in land improvement and help them finance it with collateralized loans, to strengthening minority shareholders' protections against expropriation with insufficient compensation.

The economic performance gains from reinforcing property rights have been variable, and the empirical work that inspired such programmes has come under fire – for its assumption of stronger rights causing (rather than resulting from) better performance and the way it classifies the private-owner-friendliness of different legal systems. Both the history and the present geography of economic development raise questions about the importance of such rights as a precondition for 'take-off'. Land ownership rules and shareholder protections were refined and strengthened quite late on in the development of several OECD countries, including the US and UK. China's four decades of accelerated growth from the late 1970s were achieved despite an often ambiguous and unpredictable system of property rights and levels of corruption which often placed a high private cost on private property protection.

To profit from the use of assets, it is not necessary to own them. These historical and contemporary observations often suggest that 'user rights' – entitlement to the product of land or capital equipment that has been worked on – are more economically important than ultimate 'ownership rights'. Great (and sometimes financially rewarding) work has been achieved by musicians who are allowed into a studio for just one day, or farmers who can till an allotment for just one season. Their incentives and resources can be sufficient, provided the assigned time and their entitlement to the end product are guaranteed. There may even be a greater incentive to maximize the quantity and quality of output if users are only assured of the income from what they produce, and have no lasting 'rentier' stake in the facilities with which they produce it.

When assets are expensive to purchase, liable to depreciate or become obsolete, and are needed only temporarily as part of a project or in production for which demand is volatile, it can actually be advantageous to rent or hire rather than own them. The advantage to renters can be increased if their activities are difficult for the owner to monitor, enabling them to overuse or misuse the asset without this being detected. The renter just pays for what they use (or have agreed to use), and gives up the asset when their allotted use runs out. The owner bears the cost of buying and insuring the asset, monitoring its use, overhauling and repairing it after use, and recovering any unpaid rental charges. Recovering these costs can be difficult in a competitive rental market. And if demand for the asset unexpectedly tails off, because technologies or customer demands have changed, owners absorb the shock while renters just switch to another source. The fate of GPA after the drop in aircraft leasing demand in 1991–2 (Brown 2009), and of office leasing after the 2008 financial crash (Rubinstein 2008), highlights the risk transfer and explains why lessors tend to be globally large and intricately linked to insurance and futures markets.

Just as renters benefit if they can hand a used asset back to owners without paying the full costs of its depletion and depreciation, they lose out of an asset that has risen in value during its use. Unless contractually required to, owners rarely compensate users for improvements they have made to the asset during use, or increases in the asset's resale value during that time. Ownership tends also to give some legal protections which non-owning users lack. While tenants might look to their landlord for protection against displacement by invaders of their property, landlords can also be the authors of such displacement, retaking control of the property or moving other tenants in.

The incentive to invest in upgrading or expanding production facilities is undoubtedly weakened if there is a risk of these (or their outputs) being seized by others, even with compensation. But user rights have proved adequate for long periods under relatively weak tenancy agreements, or even under customary arrangements with no legal backing. 'Enclosures', by profit-driven landlords seizing back their manorial domains from those to whom they had been 'farmed out' for decades, caused destitution and social unrest in early 16th-century England, famously chronicled by Thomas More's utopian traveller. 'For look in what parts of the realm doth grow the finest, and therefore deepest wool, there noble men, and gentlemen, yean

and certain Abbots, holy men no doubt, not contenting themselves with the yearly revenues and profits, that were wont to grow to their forefathers and predecessors of their lands, not being content that they live in rest and pleasure nothing profiting, yea much noying the weal public, leave no ground for tillage; they inclose all into pastures, they throw down houses, they pluck down towns, and leave nothing standing, but only the church to be made a sheephouse' (More 1997 [1516]: 33–4).

Enclosure is, however, a transfer rather than a creation of property rights. While the threat of enclosure weakens tenants' incentive to improve land and make long-term investments, the enclosing landlord's incentives are strengthened by the same process. In general, a system of strong property rights rewards and incentivizes present owners, but creates an offsetting disincentive for non-owners, whose prospects of ever acquiring property as a reward for their endeavours is correspondingly curtailed. Lands with no frontier (such as the US in the 18th century) can beat this restriction for a time, at the expense of those who had not asserted private property rights over the land and natural capital they used. But once all available property is assigned to private owners, a system of strong rights is likely to inhibit any improvements in efficiency (or justice) that entail new owners taking over from old.

Despite its initial adverse impacts, enclosure did improve the productivity of much land, raising crop yields and keeping a sustainable balance between tilled and grazed land as population grew. Some English tenant farmers had previously paid their landlords for the privilege of enclosing land from the village commons (Postan 1973: 58–9). And resistance seems to have fallen away once the gains in terms of food supply, and consequent widening of commercial opportunity, became apparent. 'Most of the anxiety about enclosing and engrossing arose from conditions in counties such as Leicestershire where roughly one-tenth of the land was enclosed during the 16th Century. An even greater proportion was enclosed in the following century, but the outcry against enclosure died down as its benefits to agricultural production were gradually appreciated' (Clarkson 1971: 61). Contemporary opposition to enclosure tends to arise when it substitutes private for common ownership, or allows land grabs by large corporations and private developers who – unlike the subletting English landlords – had no prior claim to it.

For production and the generation of incomes, strong user rights are generally sufficient. These do not need to be underpinned by ownership; in many cases, leaving these to a separate, absentee owner may be preferable. In an inspired work of near futurology, Jeremy Rifkin (2000) catalogues the numerous advantages of user rights over full ownership rights. Renters of buildings, machines or network capacity could avoid the overhead costs of constructing and maintaining them, and leave owners to pay for technical upgrades, without which the users would just switch to a better source. Leasing equipment allowed its fixed costs to be spread across its lifetime, and meant that lessees could avoid taking ownership of highly depreciable or obsolescence-prone assets. Trading with borrowed financial assets enabled profiting without purchasing, and opened up the potential for short-selling (whose profit was made at the expense of buyers who had 'gone long'). Those who originated intellectual property (and physical items that contained it) found that licensing it could generate more reward than selling it, while providing stronger defence against illegal copying. In a supposedly fast-changing world, 'virtual' companies that hired their premises, staff and equipment for the duration of the project could be assembled (and disassembled) much more rapidly than 'real' companies that bought them (and were often more tax efficient).

Ownership became less feasible in economies in which human capital was becoming a bigger cost than physical capital, because people could only be hired. Attempts to buy them by buying the company they worked for were often undermined when the relevant people or teams left, to set up their own firm or work for another that could give them better terms. But even where assets were still saleable, owning them conferred additional liabilities which made temporary subscription preferable to permanent entitlement. 'In the network economy, both physical and intellectual property are more likely to be accessed by businesses rather than exchanged. Ownership of physical capital, however, once the heart of the industrial way of life, becomes increasingly marginal to the economic process. It is more likely to be regarded by companies as a mere expense of operation rather than an asset, and something to borrow rather than own' (Rifkin 2000: 5).

The transition to an 'age of access' is plausible – provided assets' economic rewards flow solely from the income they generate. But ownership still matters if assets also appreciate in value – since it is

the owners who enjoy the capital gain. So the new century's shift to profit-making models based on capital gains, underpinned by the move from income to balance-sheet-based accounting, has inverted the logic of Rifkin's millennial futurology. In a world of rising stock markets, overnight gains for those who own a company's equity can often outshine years of pay for those who work in it. In a world of appreciating real-estate values, renters get thrown out when profit-taking landlords decide to sell. The economic efficiency arguments for a shift away from ownership, and from outright trading of assets, still stand. Their attainment has been undermined by financial arrangements that not only keep alive the attractions of ownership, but encourage speculative buying and selling because of continually shifting views on what assets are worth.

Accounting for property rights

Recognition of the growing economic impact of asset revaluations, and of property rights' importance in channelling that impact, has reflected and promoted a shift of accounting priorities. First at corporate, and now at national level, the ascendancy of income statements in the 20th century has given way to the primacy of balance sheets in the early 21st. This may be another spin of a cycle rather than a totally new step. In the 19th century, the pioneers of large-scale industry struggled to adapt traditional mercantile or estate-management bookkeeping to the new reality of larger, more discrete equipment purchases. Regularly updated profit-and-loss accounts enabled inflows and outflows of production and cash to be tracked with increasing accuracy, but the big factory owners also needed to take stock (literally) of fixed costs, to avoid being caught financially short when need arose for a new building or replacement machine. Capital-account concepts seem to have taken shape in the accounts of some English entrepreneurs almost two centuries ago: 'not only did they take account of capital costs, both in the form of depreciation and rate of interest, but in appropriate cases compound interest was also entered' (Pollard 1968: 257).

To profit from the revaluation of assets, it is necessary to either own them or have a firmly enforceable contract contingent on their value. The contractual route (typified by spread bets and contract-for-difference) displaces rather than replaces the direct route, since the contract must be bought if the underlying asset is not. Owners'

entitlement to profit by selling an appreciated asset is, it could be argued, their only absolute right. Rights to acquire, use and destroy an asset are, in contrast, rarely absolute, and usually restricted by law and/or diluted by others holding covenants or charges against specific aspects of the asset (Barzel 1989: Ch. 5).

Clearly assigned, legally enforceable and easily transferable property rights are essential to the growth of credit. This is a key insight from De Soto (2000), who argues that giving entrepreneurs legal ownership of their informally acquired land and property enables these to become collateral, supporting borrowing for expansion. Multiple use of the same asset, to produce directly and to raise additional capital which can produce elsewhere, becomes his 'mystery of capital' which distinguishes high-income countries from the rest.

However, strong ownership rights do not just enable the growth of credit, by providing more collateral. They make credit growth essential to production growth. The desire to preserve and expand previously accumulated wealth means that this is principally vested in land and property, a tendency that spurs the fight for strong ownership rights and is reinforced once these are granted. The continual inflow of accumulated wealth into a slow-growing property stock increases its resale value. Rising real-estate prices represent a growth of 'trapped' equity, unavailable for relending through financial markets, unless equity is 'withdrawn' again through collateralized borrowing. Securing loans against property may not initially promote economic expansion, but merely protect the economy from deflation as rising wealth flows into the repricing of land.

The assertion of ownership requires a well-developed system of property rights. Enforceable contracts require well-developed law and impartial judiciary. So activity recorded on the income statement remains primary in economies with weak property rights and unreliable judiciaries. When commercial and property law become stronger, and more independent of politics, balance sheet processes (and their feedback onto income) become much stronger.

China provides a contemporary illustration of this transition, writing large an experience many other emerging economies have gone through. For the quarter-century that followed the start of reforms in 1978, Chinese property rights enforcement remained very weak. Agricultural land was (in formal law) collectively owned, while land

brought into urban industrial use passed into state ownership. Farm and factory operators enjoyed ‘user rights’, an entitlement to sell their output and receive the income from it. Full ownership rights were less clear, with a persisting risk of expropriation – especially when the land or natural resources in use rose sharply in resale value. This promoted China’s rapid industrialization by giving producers an incentive to expand output and income quickly, before their user rights could be taken away or made worthless by the arrival of competition.

The fragility of user rights, and unclear prospects for converting them into full ownership rights, also gave producers an incentive to extract income from their activities and shift them into assets and jurisdictions in which ownership could be better established. Initially, this often meant buying government debt, which underwrote China’s substantial acquisition of overseas assets (especially US government debt) in the 1990–2010 period. From around 2007 (when China began to enact private property laws), it also meant purchase of real estate: notably owner-occupied property and (for the wealthier) buy-to-let apartments whose construction and sale in fast-expanding cities enabled rapid industrialization that drew heavily on migrant labour.

In contrast to public debt purchase, which protected personal wealth but did little to expand it, real-estate purchase opened the prospect of turning small fortunes derived from work income into much larger fortunes derived from asset revaluation. Land and apartments built on it could rise steeply in value, often with little improvement, as cities grew and absorbed their rural periphery. The widening availability of mortgages from the late 1990s allowed these capital gains to be multiplied by leverage. The rise (or rather, delayed fall) of ‘nail houses’ across urban China confirmed the strength of legal titles to this form of property, and owner-occupiers’ willingness to hold out for the magnified market value before the bulldozers could move in.

Stocks and flows: a two-way connection

In principle, economic action takes place on companies’ and countries’ income statements, which record their flows of output, income and expenditure. Balance sheets are a periodic record of the stocks that result from these flows. Surpluses on the income statement lead

to a build-up of balance sheet stocks, while income-statement deficits run down those stocks.

In practice the influence is two way, as recent boom-and-bust cycles demonstrate. An appreciation of balance sheet assets can raise expenditure and depress saving as recorded by the income statement. An asset depreciation can push spending down and savings up. Monetary and fiscal policy designed to manage aggregate expenditure and income flows must take account of 'wealth effects': the impact of business, bank and household behaviour of changes in their assets and liabilities. The Japanese downturn after 1990, and those of the US and Europe after 2008, are widely interpreted as 'balance sheet recessions' – unusually long phases of slow credit growth and low investment caused by asset depreciation, and the private sector's subsequent need to restore its 'equity' by acquiring new assets or paying down liabilities.

Even in less recessionary times, there may be a strong case for viewing the balance sheet as the centre of economic action, especially in an economy where financial institutions and 'intellectual property' make important GDP contributions. Because stocks and flows are connected by accounting identities, accounting does not in itself imply any causation. Changes in the value of stocks can be viewed as the generators of income, expenditure and output flows, just as much as their consequence. The history of accounting seems to be one of developing the income statement first, and then refining forms of balance sheet as fixed- and working-capital stocks became more important to business (Pollard 1968: Ch. 6). But the direction of accounting practice has, since the 1990s, been towards treating the balance sheet as the primary statement, and adjusting the income statement for greater conformity with it (Dichev 2008).

Financial institutions are much more easily understood by their balance sheets than by the income statements they annually construct to account for changes in these. A bank is essentially a bundle of assets financed by a bundle of liabilities and core capital. Commercial banks traditionally profited from the difference between interest they paid and received. When this margin was squeezed by competition (or by adverse selection among borrowers when higher interest rates were applied), banks added 'trading' activities designed to profit from appreciations in asset value. Insurance companies, too, acquire portfolios of assets to offset contingent liabilities. Insurers

differ from banks in drawing income from client premiums rather than borrowers' interest, and in keeping assets that are generally more liquid than liabilities. This tendency to borrow long and lend short may render them inherently less fragile than banks (Goodhart et al. 1998: 162–3) but has not spared them a post-2008 rise in regulatory capital requirements. Comparably to commercial banks, insurers' net premium income has been eroded over time (by competition and unanticipated rises in risk), compelling more supplementation of premium income with trading activity designed to bring capital gain.

Many non-financial companies have also stepped up their financial operations over time, making their balance sheets more important in understanding their overall condition. Neglect of the balance sheet situation has left some modern industrial corporations in a similar situation to their 19th century forebears, prone to sudden insolvency when their operational cash flows and profits seemed healthy. With governments now borrowing continually for investment, as well as periodically for macroeconomic stabilization, the public sector's net asset position grows in importance, future borrowing and taxation needs similarly determined by the strength of the balance sheet and solidity of net worth. But just as a government's budget imbalances have very different impacts from those of households or firms, because of the macroeconomic dimension, a government's balance sheet behaves very differently from that of a corporation. In particular, it is much more sensitive to changes in asset prices, being impacted by those of the private sector as well as the often diminishing number that are still in state ownership.

Accounting and reality

Economies and societies have long been regarded as too complex to be understood without resort to models, which isolate and simplify key interrelationships. Discussion among policy-makers, and the researchers who advise them, is frequently conducted in terms of models: which to adopt, and what effects different measures will have on it. Disagreement between political parties, and economic theories, frequently arises because they adopt different, incompatible models. A shared model promotes mutual understanding within groups, while different, incommensurable models lead to irreconcilable differences between groups.

Organizations were once viewed as directly understandable, partly because their structures (though sometimes complicated) were the result of intentional design that usually sought to keep command lines and reporting structures simple. However, the largest organizations – whether business corporations, state agencies or voluntary groups – have now reached a level of complexity that requires model-based understanding, no less than the economies and societies of which they form a part.

This has fundamentally changed the nature of corporate accounting. What was once a device for understanding the company's financial condition and operational profitability has supplanted other perspectives, and become the model by which the whole organization is assessed. In corporate accounting, only the cash-flow statement presents direct experience. The income statement and balance sheet are *theoretical* constructs, removed from reality by a layer of mediating definitions. Change to a definition, or to the way in which data are applied to it, can alter the way the company's condition and performance are understood.

In contrast to corporate accounting, the system of national accounts remains firmly focused on income, expenditure and output flows. GDP, its components and growth rates dominate policy and popular discussion. But the contemporary refocusing on balance sheets represents a shift from direct reality towards models, even more rarefied than those of most corporate accounting. If private-sector financial assets are hard to value by any retrospective or prospective method, and increasingly 'marketed to model' rather than 'marked to market', public assets' valuation is even more problematic. What price can sensibly be placed on a transport network, safe streets or the rule of law? Discussion of the public balance sheet is overwhelmingly focused on government debt, with little attention paid to public-sector assets which these might be secured against. The remarkable change in central bank balance sheets since 2008 gets even less attention. And if asset values are hard to assign, the impact of changes in asset values is inevitably hard to define.

When the circular flow of income took literal form in the 'Phillips machine', the role of stocks could not be kept out of the picture. In the machine (which owed its origins to Bill Phillips' decisions to switch from engineering to economics and from New Zealand to the UK), water is pumped round transparent tubes to show how national income divides into spending (some diverted through

government via taxation) and saving. The saving 'leakage' is offset by firms' outlays on investment, which goes back into the spending flow. Investment can exceed saving because of the supply of credit to firms, represented by a spare tank. Public spending could exceed tax revenue by a similar process; but new public borrowing was not on the designer's mind in the late 1940s, when even professors were still living on rations as the UK struggled to pay down its war debt. Some of the spending goes on imports, causing a 'leakage' that may be counterbalanced by foreign purchases of exports. The reconverged spending flow calls forth production by firms, whose wage payments become the next 'round' of national income.

To keep the floors of the machine's demonstration rooms dry, the tanks showing 'surplus balances' (when savings exceeded investment) and 'foreign-owned balances' (when imports exceeded exports) were prevented from overflowing, through deft use of the off-stage spare tank. But by showing the effects on these stocks of any prolonged imbalance in inflows and outflows, the machine had potential for a stock-flow consistency that most of its equations-on-paper counterparts turned out to lack. Sadly, with university and corporate budgets stretching only to 14 of them, it was never possible to build a global model of interconnected Phillips machines, and show what could happen if the imbalances persisted when connections to other models replaced the 'spare tank'.

Backstopped by the state

A post-war world in which most households depended on income from work could not afford prolonged mass unemployment. Governments ('right' as well as 'left') that had pledged to build and maintain welfare states, taxing those in work to finance help for those without it, could similarly ill afford to let many to slip from the first group to the second. So for a generation after 1945 governments stayed committed to full employment, and maintained institutional rules allowing the fiscal discretion that could maintain this. Asset-price fluctuations were kept low during this period, so components of the financial sector that profit mainly from asset-price changes remained very small. Fixed exchange rates and strict financial regulation reflected in the unique 30-year period in which there were virtually no financial crises (Rogoff & Reinhart 2009).

The 'Bretton Woods' restrictions that imposed this calm, by restricting (or rendering unprofitable) speculation on asset-price movements, were progressively removed after the US withdrew its support for the dollar-exchange standard in 1973. Restrictions on eligibility for mortgage and other loans, and limits on the interest rates applied to them, were rolled back, enabling lenders to reach their own credit decisions in increasingly competitive conditions. Minimum ratios of core capital to assets, and liquid reserves to assets, were allowed to fall or removed altogether. Derivative contracts designed for speculation rather than hedging (and not entailing physical delivery), previously unrecognized in common-law courts, were made legally enforceable in the 1990s, when off-exchange trading of speculative contracts began to evade regulation (Stout 2011: 14–19).

At the same time, rising incomes gave a growing proportion of household an opportunity to save, and rising longevity (with uncertain state pension provision) increased their incentive to do so. With government encouragement, households built up their subscriptions to investment funds holding corporate bonds and shares, and real-estate investments, as well as government debt. A rising number of middle- and even working-class wage earners became dependent on investment assets for their retirement income, and for lump-sum drawdowns to pay off debt or finance big expenditures ahead of retirement. For market-economy enthusiasts such as Peter Drucker (1991) this meant that pension and insurance funds were achieving, by peaceful means, the employee control of the means of production that socialists had mistakenly assumed would need a revolution. Workers' growing concern for their capital's future return ensured that their interests would realign with management's, promoting industrial-relations harmony and making trade unions obsolete.

Left-leaning economists were unsurprisingly sceptical of any claims of 'pension fund socialism', pointing out that employees still had no control over the management of the funds they subscribed to; these often lacked the diversification of typical professional investors' portfolios, and left their future non-work incomes to be drawn a much smaller range of assets than the taxpayer-financed state pensions that private funds tended to replace. Drucker's hope that funds managed on workers' behalf would take a more strategic, long-term approach to their investments were also confounded: 'short-termism', pushing managers to boost profits on an annual or even quarterly basis, came

to light in almost every subsequent investigation, with 'shareholder value' pressures becoming more acute as institutional funds further expanded their share of stock-market capitalization. A 2011–12 assessment of stock-market behaviour in the UK, where institutional funds and foreign investors accounted for almost 90% of all issued shares (ONS 2013), found a prevalence of 'short-termism . . . characterised both as a tendency to under-investment, whether in physical assets or intangibles such as product development, employee skills and reputation with customers, and as hyperactive behaviour by executives whose corporate strategy focuses on restructuring, financial re-engineering, or mergers and acquisitions at the expense of developing the fundamental operational capacities of the business' (Kay 2012: 10).

The institutionalization of investment did nothing to end the microlevel pursuit of quick capital gains which contributed to asset-price instability. Because share ownership was now widening, a less anticipated outcome of Drucker's 'silent revolution' was that large asset-price 'corrections' became increasingly disruptive to the economy, and eventually unaffordable. When large capital losses (and defaults on loans secured against devalued assets) were confined to a small group of rich investors, they could be allowed to run their course with little impact on the majority, who were not exposed to financial markets. Similarly, large property-price falls could be absorbed without economic or political fallout when the 'collateral damage' was limited to a small group of generally affluent leveraged buyers, with loans from specialist institutions. But when asset-price declines affect large numbers of lower-income households, and jeopardize the solvency of the mainstream banks that also hold their savings, the threat of 'correction' requires preventive government action.

Creative destruction, the line of Joseph Schumpeter (1942: 83) that became a byword for free markets' technical progressiveness, turns out to depend on there being a small social willing to take on high risks and be creatively destroyed. When shareholders move into the majority – as they have to be, to shield governments from overwhelming state pension costs – they can no longer be wiped out when insolvency hits large numbers of companies simultaneously. Specific risk remains tolerable when portfolios are sufficiently diversified, but the private sector needs protection against systemic risk.

The large corporation used to offer a form of direct income-risk insurance to employees, immersing them in an 'internal labour market'

that promised job continuity even if the nature and location of work had to change over time. After managers campaigned for more flexible hiring-and-firing arrangements, and institutional shareholders rallied against the unrelated diversification of operations, corporate shares – held through pension and insurance funds – became employees’ next-best option for laying-off risk. But once a large proportion of employees are exposed to equity markets for present or future income, large and lasting swings in equity prices become as politically unacceptable as large swings in real-estate prices in a land of owner-occupiers. Monetary and fiscal policies are adapted to provide an investor safety-net, for the generally middle- and high-income owners of real and financial assets. This increasingly trades off against the social safety-nets created in the 20th century for lower-income households which own no assets. Corporate welfare displaces social welfare, at a pace that accelerates when asset prices bubble and burst.

Governments have, in short, become the spender of last resort in deep recessions, and the lender of last resort when these are of the balance sheet variety. Consequent increases in public debt have left them increasingly unable (through lack of resources or electoral support) to reconstitute a redistributive welfare state. The political turn towards ‘asset-based welfare’, driven by a political desire to deregulate industry and keep taxes low, become self-reinforcing when broadening exposure to financial assets makes sharp ‘corrections’ in their prices unsustainable. But the sustainability of the turn depends on the sustainability of public debt.

The privileged role of public debt

Alarm about rising public debt led European, Latin American and several Asian governments to take an axe to public spending after 2008, inflicting ‘austerity’ whose social wounds may take decades to heal. Few economists dissented from (and many actively promoted) the view that the budget deficits amplifying the debt would inevitably fuel future inflation and inequality, flattening small savers while further fattening the big ones and that public debt would be a disastrous impediment to future growth prospects if not capped at 60–90% of GDP, depending on countries’ scope to keep interest rates down. The dramatic ascent of public debts after 2008 certainly looked alarming in peacetime historical perspective (Table 7.2).

Table 7.2 General government gross debt, G7 countries, 1996–2013 (% of GDP)

| | US | UK | Germany | France | Italy | Canada | Japan |
|------|-------|-------|---------|--------|-------|--------|-------|
| 1996 | 80.6 | 51.7 | 58.9 | 69.5 | 131.3 | 130.2 | 100.6 |
| 2001 | 64.9 | 41.0 | 60.2 | 67.2 | 123.1 | 102.6 | 151.4 |
| 2006 | 75.6 | 46.0 | 69.8 | 73.9 | 121.3 | 89.1 | 180.0 |
| 2007 | 75.7 | 46.9 | 65.7 | 73.0 | 116.4 | 84.3 | 180.0 |
| 2008 | 91.8 | 57.3 | 69.8 | 79.2 | 118.8 | 88.5 | 184.2 |
| 2009 | 104.9 | 72.1 | 77.4 | 91.4 | 132.1 | 102.1 | 207.3 |
| 2010 | 115.3 | 81.6 | 86.0 | 95.5 | 130.8 | 103.8 | 210.6 |
| 2011 | 120.6 | 97.0 | 85.6 | 99.2 | 123.8 | 107.4 | 226.7 |
| 2012 | 123.1 | 101.5 | 88.5 | 109.3 | 141.7 | 109.7 | 235.9 |
| 2013 | 122.5 | 99.1 | | | | 106.9 | |

Source: OECD 2014.

Most of the rise in public debts from 2006 could be explained as cyclical, though with an abnormally long and deep down-phase of the cycle. Governments maintained their previous level of public spending while their revenues fell because of recession, intending this ‘fiscal stimulus’ to quicken the exit from recession. As well as thereby adding to their own debt, they effectively took on large swathes of private-sector debt, by directly taking over some banks’ troubled assets or accepting them as ‘security’ for new low-cost credit from the central bank. Critics of the strategy were mainly troubled by the consequent scale of public debt, given the relatively high starting-point (which they blamed on governments for not paying down more of it when economies were growing and revenues rising). This high base meant that the extra post-crisis borrowing pushed some (European) governments towards the point where debt can escalate uncontrollably and unaffordably, as the extra risk raises the cost of new loans and makes annual repayments grow faster than annual revenues.

Public borrowing costs were likely to rise once governments net financial debts (shown in the table) had risen to match the value of their real assets, wiping out public-sector net worth, and once the scale of debts had grown so large in relation to GDP that governments were unlikely to pay them down by raising taxes, and more likely to resort to an ‘inflation tax’ on domestic creditors (or even, in some cases, an outright default). The risk was compounded by

the delayed return to GDP growth despite initial fiscal and monetary stimulus. When governments (notably in the Eurozone) were forced to start reining in their budget deficits, by reducing public spending and increasing taxes, they merely prolonged the cyclical downturn, so their debts continued to rise.

A small piece of macroeconomic accounting stood out awkwardly amid this generalized alarm. If a country's private sector wishes to save (S) more than it invests (I), balance is only retained if there is a surplus on the current account (the excess savings being exported) or a deficit on the public accounts (the government spending the funds the private sector wishes not to). Simplifying to the main components, exports (X) must exceed imports (M) and/or government spending (G) must exceed tax revenue (T).

$$(S > I) \Rightarrow (G > T) \text{ and/or } (X > M)$$

Some high-saving countries will be able to keep their budgets balanced and export the excess savings. But the outcry over the 'global savings glut', reviewed in Chapter 1, highlights the zero-sum nature of such imbalances. The world as a whole cannot run a current-account surplus, so some countries' external surpluses must be matched by others' deficits. If the world as a whole (or any country in external balance) has a saving surplus, it must run a matching public-sector deficit. Indeed, the private sector to save (and accumulate wealth), rather than invest (and accumulate capital), needs a safe instrument for saving. In countries where public debt is perennially the safest financial asset, the government must borrow in order for the private sector to save. Or by another (ultimately equivalent) reading of the accounts, any public deficit will generate the matching private-sector surplus, by creating government bonds which private investors hold.

The government (in principle) can roll over its debt forever, maintaining a stable debt-to-GDP ratio, provided the interest rate it pays (r) stays below the economy's growth rate (g). Indeed if $r < g$, the debt ratio can fall (with no increase in taxes or reductions in public spending) provided tax revenues grow in proportion to national output, which tends empirically to be the case. Most theoretical appraisals of public debt reject the likelihood of r staying above g in the longer term, because it seems to be a recipe for permanent public-sector excess. 'When the rate of trend output growth exceeds the real

interest rate a so-called Ponzi game is feasible: the government can keep financing existing debt service by further borrowing without insolvency . . . I shall assume that in the long run the real interest rate exceeds the growth rate of output and imposes the solvency condition' (Buiter 1985: 32).

Despite the assumption that lenders will punish (with a higher r) any government that plays such games, evidence suggests that g can remain above r for long periods provided – the imbalance being self-sustaining when low returns on financial wealth force its holders to invest in the real assets that expand national income. This was the circumstance enabling the US to reduce its ratio of public debt to gross national product (GNP) in the century after 1865 despite a high starting-base after the Civil War, wide deficits during the World War involvements (1917–18 and 1941–5), the fiscally expansive 'New Deal' of 1933–41, and the global 'stagflation' of 1971–6. 'The average interest rate on government debt was 4.12% per year, and the average growth rate of GNP was 5.86% per year over the period 1869–1991' (Abel 1992: 8).

Government bonds pre-dated company shares in the more combative nations, whose wars pushed up state spending even when they did not push back the start of industrial expansion. Early holders tended to be close associates of the (then mostly personal) borrowing sovereigns. Closeness to the king was generally essential both to command sufficient funds to hand over and to monitor their use so as to maximize the chance of getting them back. Loans were sometimes made to sovereigns who seemed unlikely to repay in full. Creditors' intention was to exert power over them because of the continued indebtedness or to seize some of the ruler's assets when they defaulted. When sovereigns turned to default or inflationary monetary expansion to avoid repaying in full, the next set of creditors raised their interest rates and collateral demands.

To keep sovereigns' credit lines open and avoid ceding property in lieu of repayment, public policy shifted towards interventions that would grow and strengthen the tax base, ensuring that sovereign debts could be repaid (and making lenders, with this assurance, willing to refinance the debts rather than call them in). Thus began the long transition of sovereign borrowers from the highest to the lowest credit risk and a matching reduction in expropriation risk for private enterprise within their realms. The state's emergence as a reliable creditor sealed public debt's usefulness as a wealth store.

Governments began to manage their economies so that they could repay the debt with full interest – rather than regularly defaulting, or promoting inflation to erode the creditors' real returns.

Owners of corporate equity must diversify to spread risk, a feat not always easily achieved because sometimes whole sectors' or even whole economies' worth of equities start to trend in the same direction. 'Correlation' was particularly the portfolio planner's curse in the years after the 2008 crash, but seems to have increased over time (Lewitt 2010: Ch. 7) – partly reflecting progress in international integration of goods and capital markets. In contrast, a single government bond already represents diversification, since it will be serviced and repaid from taxes levied across the whole economy. Public debt, serviced by a variety of direct and indirect taxes on a sufficiently wide tax base, is the non-socialist approach to Keynes's 'somewhat comprehensive socialisation of investment' (Keynes 1936: 378) or Moore's 'collective ownership of property claims to society's real wealth' (Moore 1975: 885).

Governments' ability to tap into any resident income stream makes their debt a universal charge on the nation's productivity, its readily resaleability adding to its value. The continued commercial placement of sovereign debt after 2008, even by states that were already heavily indebted and/or had lost their investment-grade credit ratings, seemed at first to confirm the investor appeal of the public debt instrument, in a world where even the smallest of governments spends a quarter or more of GDP. The macroeconomic warnings provoked by public debt growth – of recessions prolonged by crowding out private investment, unleashing inflation and scaring consumers with the threat of future tax hikes – proved largely unfounded. Countercyclical borrowing (in the US) was rewarded by recovery that was reining in the fiscal deficit by 2014, while immediate efforts to reduce fiscal deficits (in Europe) prolonged the downturn so that debts and deficits stayed stubbornly high.

Where governments have not achieved the production growth that could cap their rising debts, fear will now shift from the sustainability of public borrowing to its distributional implications. An already advantaged minority of bond-buying investors will accumulate entitlements to income from the general population. At the same time, tax burdens continue to shift from capital to labour, and from incomes to expenditure, accentuating the unequalizing

redistribution. And social expenditures which assisted the deprived out of general taxation are squeezed by the reverse flow of revenue towards the far-from-deprived. The rise in public debt required to rescue private assets for the 'masses' has led to a potentially dramatic inflation of private assets for the 'elite'. Then imbalance may yet be rectified by a drop in property and portfolio values for those at the top end of the wealth distribution. But the entanglement of 'high net worth' with ordinary savers' much smaller fortunes makes the chance of such a targeted correction increasingly remote.

Conclusion

Economists have, at least since the early 20th century, tried to analyse the economy as a system of flows, encapsulated in the circular flow of national income. Macroeconomic data has been focused on national *income* accounting, with the stock of national wealth not regularly surveyed before the 1980s. 'The firm' is likewise assessed on its current operations, with the balance sheet treated largely as a residual. Capital was thereby kept out of focus, with public and corporate policy focused on current production, incomes and employment and on the role of investment in expanding these.

Balance sheets have now reasserted their importance and displayed a capacity to initiate dramatic income and expenditure changes as well as to adjust to them. Deregulation of business and financial sectors, along with dismantling of restrictions on the flow of (and returns to) capital, has restored the power of asset revaluation to have much more dramatic effects on personal fortunes than any slow, sustained accumulation. The value of wealth has been detached from the productive contribution of capital, and economic policy has been forcibly shifted from the creation to the preservation of wealth.

Hobsbawm (1977) correctly identifies the period 1848–75 as the 'Age of Capital' in Great Britain, as it was during this period that the scale of the nation's capital probably peaked – probably, because capital cannot be given a stable monetary value, despite the variety of techniques on offer for its measurement. The instability of capital values is of more than theoretical concern, because of its effects on the scope and motives for earning, spending and saving. Economics may still be able to proceed without precise conceptions of capital, but economies cannot be stable without pinning its value down.

Yet the suppression of capital gains that appear beneficial to some economies is unlikely to work if widened to all.

Capitalism thrives on the scarcity of capital and its consequent openness to sudden changes in valuation. Scientific discovery and technical innovation may be the 'good' contributors to those changes, financial engineering and speculation the less benign contributors. But designing policy to favour one without the other gets progressively more difficult as the concept of capital becomes bound up with that of assets – physical objects, human attributes or contracts which generate a flow of income and/or production over time. In principle a physical capital asset, like a machine or vehicle, facilitates production or distribution for which charges can be made. An intangible capital asset, such as a skill or a patent, gives the holder access to a flow of income additional to the one they could derive from (unskilled) work. A financial capital asset, such as a bond or share, offers the holder the chance to receive income and/or capital gains due to the activities of the issuing firm. Derivative contracts built on these will, if followed through to completion, redistribute between the parties and not add to net wealth. In practice, all become 'capital', whose defiance of objective valuation leads to volatility that disconnects a country's income flow from any underlying stock. This book resolves none of the issues it raises. Recognizing their importance seems a necessary first step.

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