The NATURE of the BEAST

How ECONOMISTS mistook WILD HORSES

for a ROCKING CHAIR

GEOFF DAVIES

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It is perhaps a wonder our economies function even to the degree they do, and it is no wonder they are erratic, highly inefficient and generate extremes of poverty and wealth. Stabilised, made more coherent, and with the goal of wellbeing rather than ever-greater quantities of stuff, they could improve everyone's quality of life without destroying the natural world, our life support system.

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Mainstream free-market economics fundamentally mis-identifies the nature of market economies. Its record is of retarded growth followed by disaster. It counts costs as positives instead of negatives. It is blind to how the present banking system destabilises the economy. It is relentlessly materialistic and adversarial. It ignores most of what we know about real people and the real world.

The result is pseudo-scientific gobbledygook, and the unstable, inequitable, undemocratic, destructive and unsustainable mess known as the global economy.

The Nature of the Beast draws out the real nature of market economies using modern knowledge of systems, human behaviour, ecology, biology and physics. It points the way to stable, prosperous, democratic market economies that can support people, societies and the living world into the indefinite future.

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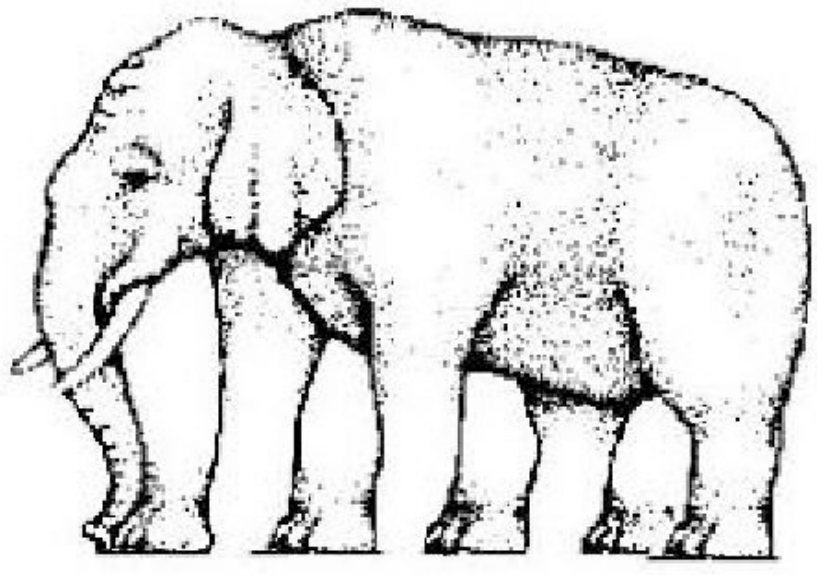
Note on Provenance

The Nature of the Beast is a distillation, extension and update of my longer 2004 book *Economia: New Economic Systems to Empower People and Support the Living World*[1], with the deeper background only briefly summarised. New information and new developments allow some points to be made more concisely or more clearly. Some important ideas have been clarified and developed further. More detail, and a caution, are given in the Postscript.

I am not an economist. I am a scientist, a geophysicist of some international distinction in my field. The purpose of a scientific theory is to provide guidance on how the world works. Scientists therefore check their theories and models against observations of the real world at every opportunity. The central theory of the currently dominant stream of economics has not been properly checked against real economies for over a century. If it had, it would long-since have been abandoned. It was this realisation that led me to write *Economia*, and now *The Beast*.

Part 1: Preliminaries

Arriving at a useful and very different conception of how economies work involves not only learning new ideas but also letting go of some entrenched and cherished old ideas. Moving on from the current delusion will be disorienting, but a better-grounded view of the world is emerging.



We are bombarded almost daily with claims of the success of the dominant economic regime. Those claims can readily be tested using basic information that is widely overlooked because obvious questions are not pursued.

1. *Escaping Delusion*

In the tropical forests of Central America are great stone temples and monuments, remnants of the Mayan civilisation that collapsed over a thousand years ago. We can never know exactly why the Mayan civilisation collapsed, but some of the main factors were probably shifting climate, over-exploitation of natural resources, warfare and internal rivalries. However a telling observation is that the grandest temples were built just before the final collapse. It is not uncommon that the grandest accomplishments of a past society came just before a precipitous decline[2]. This pattern indicates the society was busy, right to the end, doing what it had always done, doing the things by which it achieved greatness, oblivious to imminent peril.

A grand monument does not have a practical use. It does not help a society to make its living. If it is a temple it will have a spiritual purpose, but a monument also has a political purpose. It proclaims the wealth and power of the builders, who are so powerful they can afford to expend resources on a grand demonstration of wealth. Its political role is to inspire citizens and intimidate rivals. Evidently this strategy has often worked, because recorded history is pervaded by examples of kingdoms and empires that rose to power by force and intimidation, and whose grand buildings proclaim their one-time wealth. So long as the wealth underpinning the society continues to flow, the society can persist. However if the flow of wealth should falter, or fail to keep up with the ambitions of the society, the society must change its strategy. Otherwise it risks the fate of Ozymandias, of Shelley's poem. Ozymandias' once-grand statue lay fallen in a desert: "And on the pedestal these words appear: 'My name is Ozymandias, king of kings: Look on my works, ye Mighty, and despair!' Nothing beside remains. Round the decay Of that colossal wreck, boundless and bare The lone and level sands stretch far away".

The subtitle of Jared Diamond's book *Collapse* is "*How societies choose to fail or succeed*"[2]. Some societies recognised an imminent crisis, chose a different strategy and survived. The necessary first step is to recognise the approaching crisis. To do this it is necessary to break out of old habits of thought and old conceptions of the world, which commonly are deeply entrenched in a society's culture. A new vision and a new strategy must be conceived, and they must be conveyed to some who are powerful enough to effect change, who can convey the new vision and implement the new strategy.

Presumably there were some people in past societies who recognised the approaching danger, but typically they would not be among the power elite. They would more likely be peasants or merchants seeing water supplies dwindle and harvests fail. The power elite is typically pre-occupied with internal and external power struggles, and they have learned their craft in the old paradigm. Therefore it is not only difficult to get their

attention, they are also likely to be resistant to changing the status quo, within which they gained their success. If the rulers do persist with their old ways, then we may say they are operating within a delusion: their perception of the world does not match the actual state of the world. Delusion may occur in degrees. We can only guess at the state of obsession of the last Easter Islanders, desperately building their great stone statues as their island ecology collapsed around them.

It is of course much easier to recognise others' delusions than our own. In order to function we must build up a picture of the world around us, a world view, otherwise we would be paralysed in confusion and indecision. This is as true of societies as of individuals. The challenge is to recognise when the world no longer conforms to our world view. Not uncommonly the evidence of inconsistency has to become quite blatant, to hit us in the face, before we are willing to let go of our old world view. This is even more true of societies than of individuals. Psychologically this is because it is quite threatening to let go of a world view, because we think we will be directionless and vulnerable. To some degree we are correct in this, because we will rapidly have to learn new ways. However it is also typically true that the confusion and vulnerability pass more quickly than we fear. We may look back and wonder why we were so afraid.

This book argues that our modern industrial societies are in the grip of a delusion. It is not a small delusion. It is a grand delusion, and a multi-faceted one. It is deeply entrenched in our culture, though it is perpetuated most particularly by a group known loosely as *economists*. Not all economists are in the thrall of the delusion, but the great majority is. The core of the delusion was devised over a hundred years ago by a few economists who developed a theory of how economies might work. Since then many subsidiary practices and beliefs, old and new, have been incorporated into the general delusion, and economists who believe the delusion have become very powerful.

Delusion is a strong word, but I use it advisedly, as I will argue. Nor am I the only one to use it: there is an increasing number of non-mainstream economists who vigorously dispute the mainstream paradigm. Some of these were recognised by the Revere Award of the *Real World Economics Review*[3], for warning most cogently of the approach of the financial crisis that broke in 2007. The reason for inaugurating the Award is stated as "The general failure to warn of the approaching Global Financial Collapse demonstrated that within the economics profession today the general level of competence at real-world economics is grievously less than what society requires. Worse, the economics establishment has attempted to evade all responsibility for the Global Financial Collapse by calling it an unpredictable, 'Black Swan' event."[4]

The Global Financial Crisis that began in 2007, also known as the Great Recession, is the biggest economic malfunction since the Great Depression of the 1930s. You might think that those in charge when it happened, and those who designed the economic system within which it occurred, would have been chastened and purged, to be replaced by those who saw the crash coming, and those who warned that the design of the economic system was prone to such failures.

However few of those responsible have been purged, and few seem to have felt chastened. Rather, they claim that no-one could have seen the crash coming. If that were true, what exactly has the economics profession been doing for the past eighty years? Everyone knows there was a Great Depression. Would it not be a top priority to figure out how it happened, so we might see the next one coming, or better still avoid the conditions that would trigger a depression? One might think so, but that is not how the great bulk of the profession has spent the past eighty years.

The result is they didn't see the GFC coming, and the reason they didn't see it coming was they were looking in the wrong place. They were like the drunk looking for his car keys under the street light. He knows he dropped them out in the dark, but he thinks there's no point in looking where it's dark, so he looks under the light. However a few economists did venture away from the street light. They carried a torch of curiosity. They even located the keys. But no-one would listen.

To those who were looking in the wrong place the Global Financial Crisis (GFC) is indeed inexplicable. It may as well have been an act of the gods, or an act of nature, and their language implies as much. Indeed their language has long implied that the boom and bust of the so-called "business cycle", of which the GFC was an extreme swing, is just part of the natural order of things. However the GFC was not the result of some external calamity, like a tsunami, that disrupted the economic system. The GFC was an internal malfunction of the economic system. We should look within the economic system for the cause.

The cause of the GFC is not hard to locate, nor to describe. So much debt was accumulated that it could not be paid back. When some people started defaulting on their debt a chain reaction was triggered in which the more some people defaulted the more others could not pay their debts, so they defaulted, and so on. The economy had boomed as long as more money was being borrowed and spent. Then, when many people lost their money, and others were forced to pay down their debt rather than buy more stuff, the economy crashed.

There are different ways in which excessive debt can accumulate. The particular way it happened in the United States was that mortgage loans were given to people who could not possibly repay them. These were called "subprime" mortgages. The logic used was that house prices always rise, so soon the house would be worth more than the loan plus any interest due. It could be sold at a profit. Even if a person failed to make repayments on the mortgage, the bank could sell the house and take the profit itself. The fault in that logic was that there is no law of the universe that house prices should always rise. Worse, the practice itself caused house prices to fall.

Subprime mortgages were given to so many people who could not even pay the interest, including people who had no job, that many did default. The banks moved to sell those houses, but there were then so many houses on the market that prices levelled, and then started to fall. Once prices started to fall the whole scheme fell apart, because there was no profit for anyone. In the US, if you can't repay your mortgage you can just return the keys to the bank and walk away. The bank incurs the loss. Prices went into free fall and bank losses mounted dramatically. Many legitimate borrowers, just trying to buy

their family home, found they were "under water": their homes were worth less than their mortgage. Many of those lost their jobs as the economy suddenly slowed, then they lost their homes as well.

The story was complicated and aggravated by the clever "instruments" invented by the financial markets to magnify the scam. Subprime mortgages were packaged into bundles, then mixed with regular mortgages in ways that were supposed to reduce or eliminate the risks from defaults. The resulting packages were then sold to other "investors" (read gamblers and speculators) who had no way of knowing exactly what was in the packages, because the bundling was done by complex computer programs. This disconnected the mortgage pushers from the consequences of their actions. In other words they off-loaded the risk. This is a fundamental breakdown of market mechanisms.

The financial industry invented many other clever instruments with funny names and acronyms. A prominent one was the credit-default swap (CDS). Basically, someone figured out you could insure an investment against potential loss and thereby eliminate any risk: you would be guaranteed a profit. This was hailed as a great advance for civilisation. The only catch was you had to find an insurance company (or someone) that would insure your investment. While this practice was new and uncommon, some convinced themselves the risk was reasonable. Unfortunately the practice spread rapidly (why wouldn't it, it was virtually free money) until it distorted the market and the risks were much bigger than predicted by the clever formulas underlying the CDSs.

If the practice sounds dubious, it is. It was realised by a few that risk was not being reduced, it was merely being spread around and diluted. It could thus grow much bigger than it would have if a few smaller companies had failed and revealed the falsity of the arguments. Rather the risk grew until it was big enough to bring down the biggest operators, and the whole financial system. That is why a trillion dollars or so of taxpayers' money was handed to Wall Street bankers, who recovered and have gone on to make even bigger profits.

The essence of all these fancy schemes is that they were pyramid schemes. One of the few financiers who was jailed for fraud was Bernie Madoff. He was silly enough to run a naked pyramid scheme. He persuaded people to invest in his scheme, promising big payouts. He didn't actually make much money. Instead he used new "investments" to make handsome payouts to previous investors. You can sustain this practice for as long as the number of investors is increasing. However when you can't recruit investors fast enough, the scheme collapses and everyone still in it loses their money. Pyramid schemes have long been recognised as fraudulent, and are illegal in most places. Another famous practitioner was Charles Ponzi, who operated in the 1920s, and such schemes are also known as Ponzi schemes.

The subprime mortgage scheme and its associated complex financial instruments amount to a Ponzi scheme. It depended on rising housing prices, which depended on more and more mortgage loans being granted. However once the supply of mortgagees slowed the scheme collapsed and those caught by it lost money. No prosecutions for fraud have taken place. One can think of several reasons why this might be, for example that the scheme involved complex instruments whose precise functioning is hard to pinpoint, or

that a very large number of people was involved, or that many of those people are in government, or sponsor government, and don't want any prosecutions.

If such practices are known to involve high risk, and perhaps to be fraudulent, why were they allowed to continue? Where were the economic managers? Where were the academic economists? Well, many of the economic managers are drawn from financial market players, on the grounds that they understand how the financial markets work, and unfortunately such people usually share the collective delusion that financial markets are self-correcting and serving an important and positive role in the economy. Academic economists, one might think, would be more disinterested, but there seems to have been a century-long selection in the field for those who think the rich and powerful automatically serve an important and positive role in society. Courtiers usually find their necks are safer if they flatter the King rather than contradict him.

Our discussion of the economic systems can become mired in confusion if we are not careful with the names we use. The more centralised forms of socialism, including communism, are fairly well identified by those names, and there is fairly widespread agreement on the meaning of the names, and of the inadequacy of those systems.

On the other hand it is not so easy to name the other system. *Capitalism* has been applied to a variety of forms of market economy, which have changed considerably, and several times, through the nineteenth and twentieth centuries. Capitalism is also such an emotionally charged term that it can get in the way of rational discussion. Capitalism is not even an accurate term for modern economies, because they run as much on debt as on accumulated capital. Nor is there anything intrinsically wrong with accumulating capital (meaning wealth or savings), the problem is that it tends to aggregate to only a few people. Thus the problems are neither with markets nor with capital (savings), the problems are with unfettered markets and with concentrated ownership and control. There are various other names for the current regime. In Australia it has been called economic rationalism, in Britain Thatcherism, and in America neoconservatism, though there is little conservative about it. I will follow the economics profession and refer to it as *neoliberalism*.

So we come to the question of how the economy actually works. The GFC is an example of a dramatic malfunction of our present economic system, and the preceding account gives a taste of how self-interest, denial, wilful blindness and delusion have been involved in one dramatic economic episode. However there are many aspects of the present economic system and its management that are foolish, simplistic, deluded and distorted by self interest. This claim might sound a little hyperbolic, but I will present a long series of follies for your edification, and you can judge for yourself. Nor am I alone in making very strong criticisms. Economist Edward Fullbrook refers to mainstream economics as "human error propagated by a virulent ideology skilfully camouflaged as science."[5] James Galbraith refers to "a Politburo for correct economic thinking", comprising "leading active members of today's economics profession"[6]. Dissenting voices are generally marginalised and not easy to hear.

However most other dissenters do not attempt such a fundamental and comprehensive reckoning as I present here. I am a scientist, not an economist. This means I do not have to unlearn a lot of basic misconceptions. I am more willing to recognise fundamental errors, and blunter in my description of them. I also bring a clearer view of what an economic theory, or any theory, is for. Yet another misconception of mainstream economics is that mathematical sophistication and rigour ensures that their subject is scientific. The purpose of a theory is to provide a useful guide to how the world works. Some very useful theories use only rather simple mathematics. Though economic theories often come packaged in very sophisticated mathematics, they are still only useful if they bear some resemblance to real economies. If, as is often true, the theoretical behaviour bears no significant resemblance to the real world, then the theory is useless and the application of it is pseudo-science. Even the dissenting economists usually do not go so far as to call mainstream economics pseudo-scientific, or perhaps pre-scientific.

Mainstream economics is such an incoherent grab-bag of arcane theories, archaic practices and simplistic misconceptions that it is not easy to present a critique that has some a logical flow. To help find our way through the confusion I have used plenty of sign posts, in the form of section titles and chapter titles. In some chapters there are headings and subheadings. They are there to help you to keep track of where you have come from and where you are going. I have stayed in narrative style as much as possible, but sometimes there are so many strands to disentangle that I have resorted to headings.

There are such basic things wrong with mainstream economics it is not even obvious where to begin. For example the way economic accounting is done amounts to entering all transactions on the credit side of the ledger, whether they are an income or a cost, adding them up and claiming that a bigger total means we are better off. Or one can examine the performance of the past few decades (prior to the GFC), and show it was mediocre at best. Then again the way banks are run and money is supplied to the economy maximises debt, promotes instability, pumps money to the already-wealthy and fosters parasitic speculation. Despite the resulting heavy load of debt we carry, the elaborate economic computer models used to justify economic policies do not include money or debt in their calculations. Rather, the models assume we still use the primitive system of barter. Many times in my learning about economics I have thought "Surely that can't be right?" But many times it has turned out to be so.

However there is one problem with mainstream economics that is fundamental, and that is the claim that free markets will automatically yield the best outcome. The neoliberal ideology is essentially a statement of faith in individual action, and in the economic arena this translates to a belief in the goodness of unrestrained markets. The claim derives from a theory, and the theory uses a series of assumptions about the world that amply illustrate my claims of folly and delusion, as will be shown in a later chapter.

Mainstream economists think the economy is like a rocking chair. If you push harder the chair will rock through a wider arc, but if you stop pushing it will soon settle back to a balance point, the equilibrium point. The free-market theory says the economy always tends to settle towards a *general equilibrium* in which all supplies balance all demands. The general equilibrium is the nirvana, a blessed state in which the economy functions at its

greatest conceivable efficiency. This nirvana occurs in a highly idealised theoretical world. The question is whether this ideal world bears any useful resemblance to the real world.

If the general equilibrium theory described the real economy then the only time the economy would suddenly change would be when something external disturbed it, like a natural disaster or a war. However the economy has repeatedly changed suddenly when nothing in particular was happening in the real world. In 1987 stock prices dropped 30-40 per cent in one day, though 30 per cent of the world's factories had not been bombed overnight. In 1997 there was the Asian currency meltdown, during which a global financial freeze-up was narrowly averted. Earlier this century we had the bursting of the Japanese property bubble and the American dot-com bubble.

These events straightforwardly demonstrate that economies have often been far from equilibrium. It is not hard to argue, as will be done in this book, that modern economies are always far from equilibrium. In that case the mainstream theory has nothing useful to say about how economies behave. It is an irrelevant abstraction. Furthermore, we can expect the behaviour of a far-from-equilibrium economy to be *radically* different from that predicted by the mainstream theory, as different as wild horses from a rocking chair. The mainstream theory is not just useless, it is highly misleading.

Neoliberalism has promoted competition, selfishness, conflict, inequality, and a decline in family and community cohesion. It has required us to be subservient to the economic machine, and thus to the economic warlords who run it. Despite all this, it is still failing in its primary role to provide for everyone's material needs, now and into the future.

On the other hand the communist version of socialism also required subservience to an economic machine. It promoted social uniformity that stifled spontaneity and creativity, and it seems to have been even less able to provide for material needs.

Looking back at the twentieth century, we can see two world views that may each have had some useful ideas to contribute, but that were taken to extremes that turned destructive. One extreme relied on competition and excluded cooperation, while the other extreme relied on cooperation and excluded competition. Neither extreme has worked well, and the political contest between them nearly terminated civilisation in a nuclear holocaust.

Each of these two world views fundamentally mis-identified the nature of economic systems. Indeed they each reflect a deeper misconception of life and how it is lived. Neoliberals adopted the mainstream economics view that economies are near-equilibrium systems that self regulate to stay near equilibrium. Communists adopted Marx's implicit view that an economy is a predictable machine that can be managed by a bureaucratic five-year plan. Neither of these pictures comes close to identifying the nature of modern industrial economies. Readily available evidence shows economies are full of instabilities, and thus are very far from equilibrium. The internal instabilities render them unpredictable in detail, and thus impossible to manage with a five-year plan.

We need a better way to organise our economies. It will help if we step back and ask some basic questions. What is an economy? My answer is that it is the way a society makes its living. What is an economy for? It is to provide the material needs of a society. Its purpose is also, I will argue, to support the way a society chooses to organise itself. I gave a two-part answer to the second question because the way we organise our economy can have a large effect on the organisation of our society.

In the latter half of the twentieth century new insights from diverse fields like engineering, biology, physics, ecology and neuroscience converged to form a new field called *systems science*. Systems science is about the behaviour of collections of interacting components. The components might be computer parts, or grains of sand, or cloud droplets, or ants, or neurons. The realisation has been that unexpectedly complicated behaviour can result when large numbers of relatively simple components are interacting. The foraging strategy of a colony of communicating ants is quite different from, and more sophisticated than, the foraging strategy that an isolated ant would follow. Such new behaviours are said to *emerge* from the interactions within the system.

Systems that develop *emergent* behaviours are called *self-organising* systems. Some self-organising systems have relatively simple behaviour. For example, sand grains blowing across a dune self-organise into a series of ripples on the surface of the dune. Other systems develop very complicated behaviour, and they are called *complex self-organising systems*. In some systems the behaviour becomes so complicated it cannot be distinguished from randomness, and they are called *chaotic systems*. The global weather system is chaotic in this technical sense. There is thus a range of behaviours of self-organising systems, from fairly simple through increasingly complex to chaotic.

In the light of this new knowledge, we can identify modern economies as complex self-organising systems, or *complex systems* for short. This identification leads to a wealth of new insights. For example, the behaviour of complex (and chaotic) systems is not predictable in detail; a complex system can exist in many possible states; and typically a complex system will sit in one such state and be relatively steady for a time, but then make a relatively quick transition to another state. Each of these characteristics is quite different from the gentle, predictable oscillations about a unique state claimed by mainstream economics. They offer a glimpse of why I said earlier that the behaviour of modern economies is radically different from the predictions of mainstream theory.

Living systems are also complex systems, so our recognition of economies as complex systems identifies them as relatives of living systems. It may in fact be better to think of economies as living systems. This is not meant to be a fanciful new-age metaphor, it is meant literally. Many components of economies *are* living, most obviously the people in the economy but also the domestic plants and animals and the many parts of wild nature that we exploit or depend upon.

Like living systems, economies are unpredictable in detail but they can have identifiable *characters*, in the same way that we can recognise the dog-character of a dog, and distinguish it from cat character. A dog or a horse is not as easy to manage as a machine, but we know we can train a dog or a horse by working with its innate character,

so it becomes much easier to manage. In the same way we can perceive the character of an economy and, by working with its innate tendencies, learn to manage it.

We have failed to recognise that a modern market economy, left to itself, is like a team of wild horses. The neoliberal approach has been simply to harness our wagon to the wild horses and let them go. After a lot of kicking, bucking and pulling in different directions our progress has been erratic and our wagon is breaking up and threatening to tip into a ditch. The communist approach, on the other hand, was to shackle the wild horses so thoroughly they could hardly move. If we study the behaviour of our wild-horse economies more carefully, and learn to tame them before we harness them to our wagon, we might find we progress more quickly, with much less fuss, and in the direction we really want to go, instead of into the ditch - or over a precipice.

Most people recognise that a healthy life requires balance. We need to balance work, family life and sleep. We need a balanced diet. We need to balance the demands of our families with our own need to be healthy and fulfilled. Children need a balance of freedom to be themselves and restraint to keep them safe and to guide them into healthy lifestyles. Every society needs to balance cohesion with the individual needs of its members. Cohesion requires cooperation. Individuality may involve competition. There is a place for both, and a healthy balance will keep the society vigorous.

The need for a balance between competition and cooperation is not unique to human societies, it pervades all living systems. The old conception of nature red in tooth and claw tells only part of the story. Cooperation also pervades nature, in many degrees and many forms. All mammals form social groups, and within each group each individual must balance its own needs with the needs of the group, upon which its survival also depends. This has been a very successful survival strategy for mammals. More elaborate forms of cooperation can be found among ants, another highly successful group. Extreme forms of cooperation occur among the trillions of cells that comprise your body, and in symbiosis, which is the actual merging of organisms and is fairly common. On the other hand some organisms practice minimal cooperation, examples being reptiles and many free-living bacteria. The point is not to extol cooperation over competition, or *vice versa*, but to recognise that *both* are present pervasively in the living world.

The great mistake of both of the dominant twentieth century political world views was to imagine that human beings can live at one extreme or the other, either in total cooperation or in total competition. Each is unhealthy and each system sickened and died, or is dying.

Complex systems have their own version of balance. The range of behaviour displayed by a self-organising system, whether it is simple, complicated or chaotic, is determined by the nature of its internal interactions. Complexity only arises when interactions among components are appropriately balanced. If the interactions with neighbouring components are limited and weak, the system may be repetitive, boring, mechanical and effectively dead. If the interactions are more pervasive and/or too strong, the system may become chaotic. Complex systems have intermediate levels of interaction, and their behaviour is neither chaotic nor dully repetitive. There is order, as components

coordinate, but the order is continually shifting in small ways, and occasionally there is a large shift. There is change but it is episodic rather than continuous and chaotic, and the system is reasonably predictable much of the time. In a complex system the components are neither drifting loosely nor locked into a rigid structure

Living systems are identified as complex systems *par excellence*. An organism needs substantial continuity so it can function and live. It also needs a degree of flexibility so it can adapt to changing circumstances. Thus living systems balance order with change.

Perhaps the clearest recognition of the need for balance in life is to be found in Taoist philosophy. *Yang* qualities, such as action, masculinity, light, reason, resistance and order need to be balanced by *Yin* qualities, such as contemplation, femininity, darkness, intuition, yielding and creativity. The most fully realised people "by their stillness become sages, by their movement kings". Taoism arose from the close observation of nature and people. It distills a higher wisdom than either of the crude world views that dominated the twentieth century. We can aspire to create economies that transcend the crude and unhealthy economic systems that arose from those twentieth century world views, and that provide for and nurture a healthy balance in the lives of people and societies.

We need to move beyond the false dichotomy of socialism *versus* "capitalism", one over-emphasising cooperation and the other over-emphasising competition. We can even move beyond the conception of the post-war social democracies, in which the worst excesses of capitalism were countered by direct government action to redistribute some wealth and to provide some services to the poor. If we recognise that a tension between competition and cooperation is natural and healthy, we can aspire to find productive balances between them. Instead of just trying to ameliorate the results of minimally-regulated markets, we can recognise that markets might be managed by adjusting the internal interactions that control their behaviour. This can be done using financial incentives and disincentives, and some regulation. We can thus aspire to manage markets so they don't produce excessive concentrations of power and wealth, and so they deliver quality of life for everyone, rather than just delivering more and more stuff, inequitably distributed. We can conceive of a managed-market economy that is intrinsically more stable, less inequitable and more democratic than previous systems.

The need for a healthier conception of economies is not just a matter of improving human welfare and social justice, important as those goals are. Our global industrial market system is rapidly degrading the planetary environment, to the point that the survival of industrial civilisation is threatened. We need economies that nurture not only healthy people and healthy societies, but a healthy environment as well. This will require us to recognise that a healthy environment is not an expensive luxury, it is a necessity for survival. All of our food, all of our clean water and our very breath is provided for us by the rest of the biosphere, and none of our clever technologies has changed those basic facts. The environment's health is our health. As it degrades so do we. If it dies, we die.

Economies that will sustain us indefinitely and provide for our health and fulfilment are well within reach. To get there, we need to choose a new strategy. We need to shift some of our attitudes, some of our habits of thought and the way we organise ourselves.

There are many existing inventions and ideas that reduce our heavy footprint on the Earth, so we need to promote their widespread adoption. The change does not require grand new technologies nor increases in authoritarian control. Change will be resisted by those who find any change threatening, and by those who profit from the present order. They will be overcome not by force, which will only feed their resistance, but by persuasion and by the resolve of the majority that wants a better future.

2. *Mediocrity: Prelude to Disaster*

There is nothing new in the idea that the rich and powerful should be free to run society according to their own interests, which they typically see as being the same as society's interests. Indeed that is a description of most of recorded history. Nor is the idea of free markets so new. In the so-called gilded age of the late nineteenth century a *laissez-faire* principle was predominant and commerce was supposed to be left alone to do what it does best. Competitive mercantilism, with national governments effectively co-opted into its service, arguably led to World War I, the Great Depression and, effectively arising from those, World War II[7]. For a time after those calamities governments more actively managed economies in the broader interests of society, with clearly beneficial results as we will see. However advocates of what became neoliberalism waged a concerted campaign, starting after World War II, to establish the alleged virtue of free markets in the minds of right-wing politicians. About 1980 the campaign bore fruit spectacularly, with the election of Margaret Thatcher in Britain and Ronald Reagan in the US.

Thatcher and Reagan combined a passionate devotion to free markets with great political skill to bring the neoliberal world-view to the apex of power. Their logic was simple. Free markets are supposed to get the economy working at maximum efficiency. Maximum efficiency would mean more wealth for a given effort, or for a given input of resources, so it ought to be a good thing. More wealth will mean less poverty and more jobs.

So markets have been glorified and deregulated and the role of government denigrated and diminished. In Australia and Britain publicly-owned enterprises like airlines and banks have been sold off, "competition" has been required even in natural monopolies like electricity supply, collective bargaining by employees has been restricted, and even regulations for public health and safety have been weakened or removed.

Do free markets really work? It turns out that readily available evidence shows they hadn't lived up to expectations, even before the global financial crisis that started in 2007. This may seem surprising, given the steady barrage of hype about the manifest goodness and abundant benefits of free markets. However once you know a little about how the allegedly free markets really work it's not so surprising. The only real surprise is that the evidence of poor performance is so readily available and so clear, but so little noted.

Economists who dissent from the mainstream have, increasingly, been asking basic questions and gathering relevant data. One of the more telling recent graphs was compiled by Robert Reich, a persistent US critic of neoliberal policies, and it is shown in Figure 2.1.

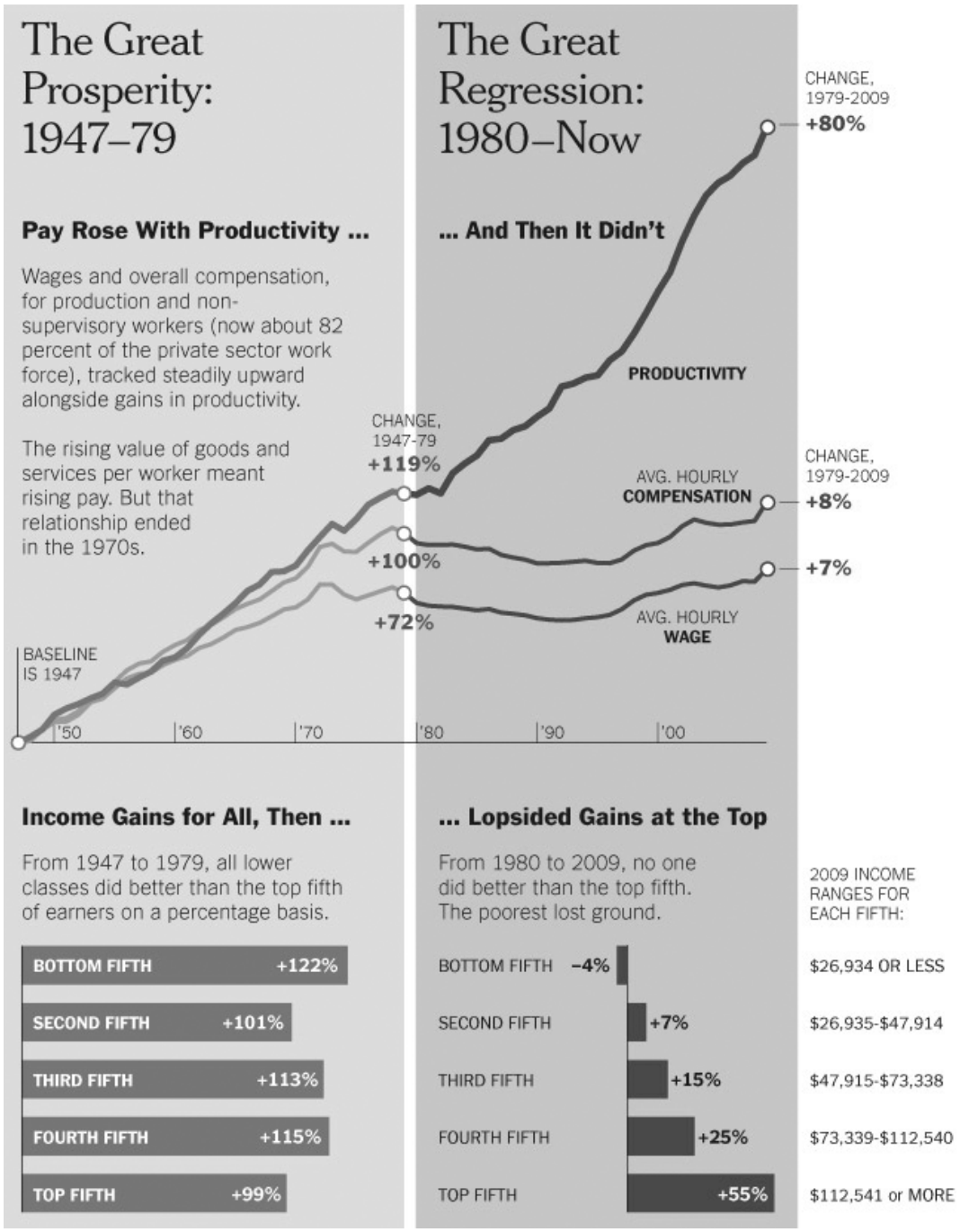


Figure 2.1. The neoliberal era compared with the preceding post-war period: US productivity and income changes. The top graph is on a logarithmic scale, in which steady percentage increases plot as a straight line. From Reich[8].

Figure 2.1 shows very clearly that neoliberal policies have not benefited most people. It is astonishing, given the incessant neoliberal proclamations of the virtues of free markets, that average hourly wages in the US, corrected for inflation, have hardly changed since 1979. Many other measures tell the same story, as we will soon see. Although productivity rose steadily through the whole post-war period, most of the gains in wealth since 1979 have been captured by the wealthy. In contrast, during the preceding period governments actively and successfully managed the economy so the benefits flowed to everyone.

The highly unequal distribution of wealth in the US is illustrated in Figure 2.2(a). The bottom 80% of people held only 12.8% of total wealth in 2009, whereas the top 5% held 63% of wealth. This inequality has grown dramatically during the neoliberal era, as shown in Figure 2.2(b). Of total income growth in the US from 1979 to 2007, those in the bottom 20% of incomes received only 0.4%. On the other hand those in the top 20% received three-quarters (75.2%). Indeed those with the top 1% of incomes gained over one-third (38.7%). The distribution of income gains has been grossly inequitable, with the poor getting virtually nothing.

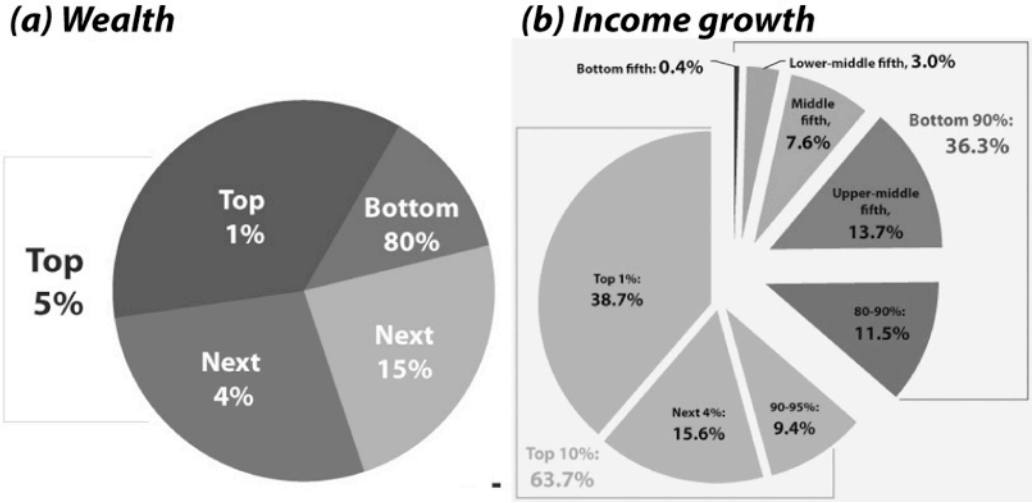


Figure 2.2 (a) Distribution of wealth in the US, 2009.[9] (b) Distribution of income growth, 1979-2007.[10]

The stagnation of wages has been disguised by common official use of household income as a measure, rather than the income of individuals. Median household incomes have risen slowly, but this is because more women have entered the workforce. In 1979 47% of women with children under 18 worked, whereas by 2008 71% of them worked[8]. The stagnation of wages was also disguised by households taking on more debt: In 1979 household debt was about 80% of annual household disposable income, and it peaked at 132% of disposable income in 2007[8], just before the GFC bubble burst.

Hidden within the household income figures is a startling change in men's earnings in the US. They were rising strongly before the 1970s, but Figure 2.3 shows that median earnings of men in full time employment have declined slowly since then. However this does not take account of the fact that a smaller percentage of men is now employed. The rest are either unable to find work, discouraged from looking for work, or in prison. Because of their exclusion from the workforce, median earnings of all men have declined quite dramatically, by around 30% since the 1970s.

Not depicted in the graphs is the fact that employment has become less secure during this period. Thus people have been made to work more and to bear increased risk and uncertainty, but most people have received little to compensate for this increased burden on their lives.

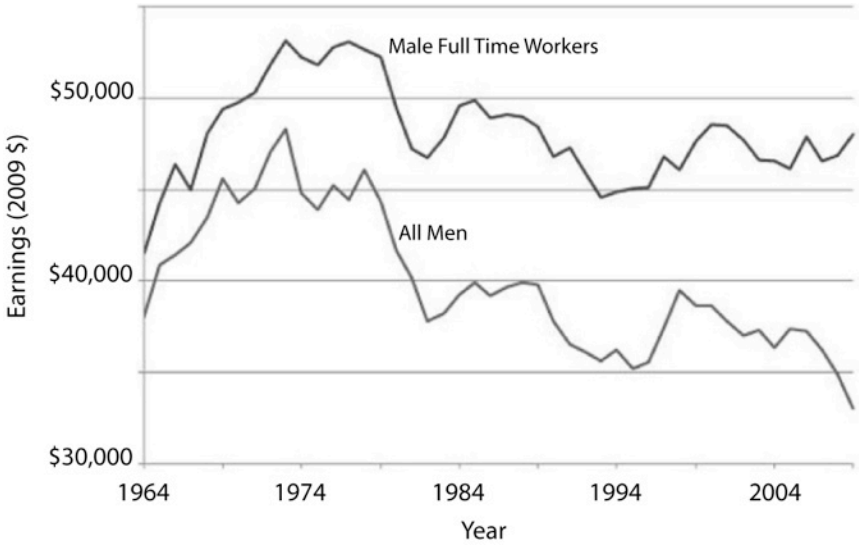


Figure 2.3. Median annual earnings of American men. From Greenstone and Looney[11].

Neoliberal apologists usually argue that although the rich are getting richer so are the poor, just not as quickly. This is the so-called trickle-down theory. It is evident that when markets are left to the mercies of the rich, they siphon the wealth into their own pockets. There is been very little trickle-down in the US since 1979. In the preceding post-war period, wealth did flow to all income groups, but only because the government intervened through progressive taxes and other measures. Wealth did not trickle down even then, as it would be more accurate to say that wealth was pumped down, by the government, to counter the many ways in which the wealthy suck the wealth into their own pockets, some of which will be encountered in later chapters.

The failure of neoliberal policies is not confined to the US, nor is it manifest only in an unjust flow of new wealth. The failure has been essentially world-wide, and overall growth of wealth has been distinctly slower than in the preceding period. Averaged over

many countries, growth in gross domestic product (GDP) since the neoliberal ascendancy began in 1980 has been less that half what it was before. From 1960 to 1980, the average annual growth of GDP for 109 countries was about 2.5 per cent. From 1980 until 2005 the average growth rate for 175 countries was only about 1.1 per cent.

The numbers are summarised in Table 2.1. The Table includes a breakdown by income category, from the poorest to the richest, and only in the poorest category is there a slight increase from the earlier to the later period. It turns out that's because this category includes India and China, which have not run neoliberal-style economies for most of this period. If they are excluded there's a slight decrease in growth rate for that group too.

For the second-poorest group, defined by incomes between $1238 and $2332, the change has been particularly disastrous, the growth rate falling from 2.4 per cent to 0.7 per cent. With the earlier growth rate they would have doubled their wealth in about 30 years, but with the actual later growth rate their wealth would take 100 years to double. At the average 1.09 per cent growth rate of all countries for the later period, wealth would take about 64 years to double.

Table 2.1 World economic performance, before and during the neoliberal era.[12]

	1960-1980		1980-2005	
Income range, US$	Number of countries	Annual GDP growth rate, %	Number of countries	Annual GDP growth rate, %
355-1225	29	1.7	28	1.8
1238-2332	27	2.4	30	0.7
2364-4031	24	2.6	33	1.0
4086-8977	17	3.6	40	1.3
9012-43713	12	2.6	44	1.3
Average	**(109)**	**2.47**	**(175)**	**1.09**

Each row shows results for a subgroup of countries defined by an income range. For example in the period 1960-1980 29 countries had average annual *per capita* incomes that fell between $355 and $1225; this defines the poorest group of countries. The bottom line shows growth rates averaged over all countries. Because of changes in availability of data, the particular countries falling in a given group may differ between the earlier and the later period.

The neoliberal era has also been bad for Latin America. Whereas Latin America grew by 80 per cent in the earlier two-decade period, it grew by only 11 per cent in the next two decades and a further 3 per cent from 2000 to 2005. If Brazil had continued to grow at its earlier rate it would have had European-level incomes today, and Mexico would have been not far behind. Instead Brazil recently teetered on the brink of an economic collapse, and Argentina did collapse in 2001. The 1980-2005 period has been the *worst in modern Latin American history, worse even than the Great Depression.*

Not surprisingly, measures of social wellbeing have been strongly affected by the big slowdown in economic growth. Rates of increase of life expectancy for poor and middle-income countries fell from 4 extra years per decade to only 1.5 years per decade. There was virtually no improvement for the second-poorest group. The rate of increase of public spending on education was roughly halved, with consequent falls in the rate of increase of enrolments.

Although these numbers are based on a recent compilation of official data, the message is not really that new. Table 2.2 summarises some basic numbers from slightly earlier periods for Australia and for the OECD (Organisation for Economic Cooperation and Development, basically the industrialised nations).

Table 2.2 Economic performance, pre-1974 and post-1974.[13]

	Pre 1974	1974-83	1983-93
Australia			
GDP annual growth (from 1960), %	5.2	1.8	3.4
Inflation (CPI annual increase, from 1953), %	3.3	11.4	5.6
Unemployment (from 1953), %	1.3	5.6	8.4
Current Account Deficit (%GDP, from 1959), %	2.4	3.1	4.4
OECD			
GDP annual growth (from 1960), %	4.9	1.6	2.8
Inflation (CPI annual increase, from 1960) , %	4.5	11.1	6.8
Unemployment (from 1953) , %	3.2	6.4	8.4

The three decades or so after World War II featured rapid growth of Australian GDP (over 5% per annum), relatively low inflation (3.3%), very low unemployment (1.3 percent!) and relatively low foreign debt (measured through the Current Account Deficit, which takes into account flows of money as well as the trade balance: 2.4% of GDP). During the decade 1974-1883 industrial economies were disrupted by a debt bubble and "oil shocks", when oil supply countries raised the price of oil many-fold. Things settled down after that, but up to 1993 the figures were still not as good as those for pre-1974: growth 3.4%, inflation over 5%, unemployment over 8% and foreign debt over 4% of GDP. For the decade of the Howard Governments, 1996-2007, GDP growth was in the 3-4% range and inflation in the 2-3% range, but unemployment has only recently fallen below 5% and the current account deficit is over 6% of GDP. Thus the Australian economy has still not been doing as well as it did in the nineteen fifties and sixties.

A similar story can be seen in Table 2.2 for the whole OECD. Thus by economists' standard measures, including GDP growth, free-market economies have not done nearly as well as they did in the previous era of managed economies. Before about 1980, most governments intervened much more in the economy, since the philosophy then was closer to that advocated by Keynes, who had argued that economies would run better if they were actively managed.

The record portrayed by these figures is, at best, one of mediocrity and for some it is a record of clear failure. Yet this conclusion is so contrary to the dominant message we have been hearing for a quarter century it bears some reinforcement. The cases of Brazil and Argentina will serve, though there are many others.

Brazil's GDP increased fourfold between 1946 and 1985. Despite following the exhortations of neoliberal free trade and domestic policy doctrines, principally delivered though the agencies of the International Monetary Fund and the World Bank, the proportion of Brazil's export earnings used to repay international debt increased from 30% in 1960 to 78% in 1980 and to over 100% in 1990[14].

Within this period, Brazil's economy supposedly developed substantially, more so than many poor countries. The "development" often involved converting from traditional sustainable agriculture to cash crops for export, plus unsustainable extraction of resources from the Amazon rainforest. In the process, indigenous populations have been displaced, as many as 28 million people between 1960 and 1980[14]. Many of the displaced people moved into cities and shanty towns. Others have tried to convert rainforest to agriculture or have tried to farm easily-eroded hillsides, creating major environmental destruction in the process[15]. Between 1977 and 1984, production of basic food such as rice, black beans, manioc and potatoes fell by 13%, while exportable crops such as soya beans, oranges, cotton, peanuts and tobacco rose by 15%. By 1998, an estimated 50% of Brazil's population suffered from malnutrition[16]. Late in 2002 Brazil was poised perilously close to the kind of collapse suffered by neighbouring Argentina as a national election rejected the neoliberal government in favour of a labour-based President. Although the new President was severely constrained by the threat of capital flight and associated IMF restrictions, Brazil has begun a slow recovery.

Late in 2001 Argentinians took to the streets in despair over the country's dire state and for several days there was effectively no government at all. Purchasing power had almost halved in five years and 40% of a once moderately prosperous population had been pushed below the poverty line. The genesis of Argentina's decline follows the now-familiar pattern of opening to free trade and the inflow of speculative capital, a progressive slide into trade deficits and heavy debt, social decline engineered by neoliberals, corruption, and heavy-handed intervention by the IMF. Since the early 1970s external debt increased from $8 billion to $132 billion, the $40 billion proceeds of privatisation sales were dissipated, functional illiteracy increased from 5% to 32%, those in extreme poverty increased from 200,000 to 5 million and unemployment increased from 3% to 20%. The so-called show state of the IMF was in total financial collapse and near anarchy[16].

This story has a happier ending[17] that makes the lesson even clearer. Argentina's response was to default on $95 billion in international debt, un-peg its currency from the US dollar, and to break away from the IMF and its austerity formulae. It has also nationalised private pensions and used central bank reserves to increase government spending rather than impose austerity measures, and forced bondholders to suffer before ordinary citizens. Argentina had only one quarter of further contraction after the default and had returned to pre-crisis national income within three years. From 2002 to 2011 its GDP grew by 94% in real terms, an average of about 7% real growth, much the best in the hemisphere. Figure 2.4 shows the dramatic turnaround visually.

Argentine social spending has nearly tripled. Poverty and extreme poverty have been reduced by about two thirds. Employment has increased to record levels. There has been a burst of inflation, but most peoples' lives have improved dramatically. Cristina Fernandez de Kirchner was re-elected as president in October 2011 by a near-record margin, despite having faced hostility from the media for most of her presidency, and from many of the most powerful economic interests in the country. Brazil has also improved considerably since it paid off its IMF loans and moved away from IMF austerity, not as dramatically as Argentina but far better than it had been faring.

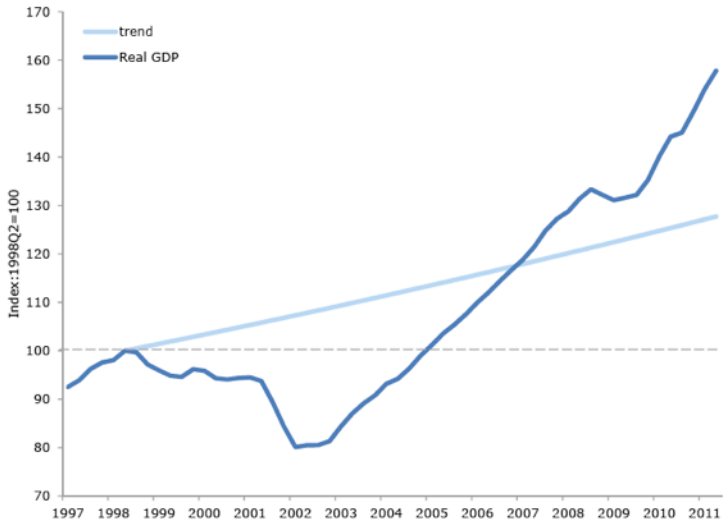


Figure 2.4. Changes in the Argentine GDP. Under neoliberal policies the GDP peaked in 1998 and then declined, until the crisis of 2001-2. After neoliberal policies were abandoned the economy recovered rapidly and has shown the strongest growth in the Americas. "Real GDP" is adjusted for inflation and season. The straight line is the average trend. From Weisbrot[17].

The neoliberal program has been mainly a wealth-transfer program, rather than the wealth-generation program it has been touted as. That is ironic, because it is right-wing politicians who speak most forcefully against income redistribution, when it involves

transferring some wealth downwards. For example progressive income tax scales effectively transfer wealth to the less wealthy by taxing the rich at higher rates than the poor. If the poor then receive more of the services paid for by taxes than the rich, wealth has been effectively transferred. Of course if the rich access more taxpayers' money, through such things as industrial subsidies and bank bailouts, then wealth may be transferred the other way, to the rich.

A particularly clear illustration of the direction of wealth transfer is shown in Figure 2.5. If the distribution of after-tax incomes had remained unchanged between 1979 and 2007, the after-tax income of the median family would have been $9,000 (16 percent) higher in 2007 than it actually was. Instead of an income of $55,300, this typical family would have had $64,700. The story is similar for everyone in the lower 80% of income distribution. The Figure shows they would be between $6,500 and $11,700 better off if incomes had not been so skewed to the rich. In contrast, those whose income falls in the top 20% are $38,100 better than if income distributions had remained the same. For those whose income falls in the top 1%, they have gained $740,900 from the redistribution of incomes, quite apart from the gain in total wealth the US has experienced over the past three decades.

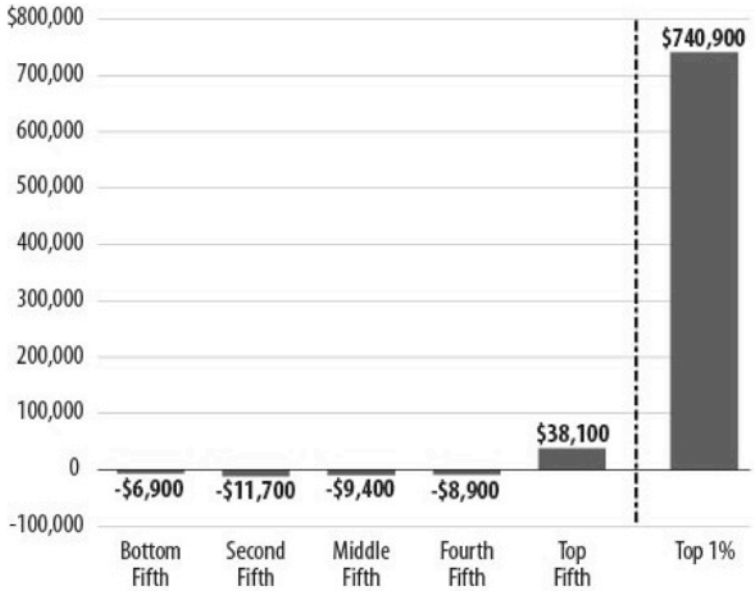


Figure 2.5 Average change in US incomes relative to what incomes would be if the distribution of after-tax income was the same as in 1979.[18]

These figures make it clear that even before the Global Financial Crisis neoliberalism had not benefited the majority of people in either the rich counties or the poor countries. For many people, particularly in some poor countries, neoliberalism was already a disaster. The increased wealth flowed almost exclusively to those with already-high incomes. Thus the old trickle-down and rising tide cliches of capitalism do not apply to the neoliberal era. The rising tide of wealth did not lift all boats, and wealth did not trickle

down even to the middle class, let alone to the poor. If Argentina was the show-state of the IMF and international neoliberalism then the United States is the neoliberal homeland. Ordinary people in both countries did poorly. Even before the GFC, neoliberalism served only the wealthy. Worse, it slowed or even reversed the overall increase of material wealth in many countries.

Neoliberalism is relentlessly materialistic. Life, on the other hand is, or should be, about much more than material gain, particularly for so many in the rich countries who already have so much. Later we will look at how the *quality* of our lives has fared, and the verdict on neoliberalism will be harsher.

Part 2: The Core

The core of mainstream economics is an abstract theory over a hundred years old. It requires quite particular assumptions to reach its claimed conclusion, that free markets tend to a general equilibrium. Several of the key assumptions are blatantly violated in real modern economies. On the other hand a modern conception of self-organising systems can accommodate reality and give far more insight into the behaviour of modern economies.

"It was at this point, gentlemen, that reality intruded."

Fundamental implications flow from more clearly recognising the nature of economies. Economies are deeply affected by social interactions, and social interactions are fundamental to being human. Every economic entity, and level, must maintain healthy relationships with its neighbours, its component parts, and the larger whole of which it is a part. To neglect the proper care of boundaries and economic relationships is to risk haemorrhaging and poisoning. The "wild horse" conception of an economy may seem to preclude easy management, but basic general strategies can be readily identified.

3. *Dozing in the Rocker*

Most people don't deal much with abstract ideas and theories, yet ideas exert a powerful influence on societies and history. Societies and civilisations have come to grief because they held ill-adapted ideas. What idea was it, for example, that led the Easter Islanders to obsessively build huge stone effigies even as the ecosystem of their island was collapsing around them? Richard Dawkins[19] invented the term *meme* for key ideas. Memes are to cultural evolution as genes are to biological evolution. A very powerful meme abroad in the world today is that free markets are the best way to organise economies. Where did this meme come from? Is it serving us?

Adam Smith is regarded as having founded modern economics in his great book of 1776 *The Wealth of Nations*[20]. He is hailed as a hero by many free-market economists, and derided as a villain by some critics of free-market economics. He is credited with the great insight that people trading in markets will, if the markets are left to operate freely, bring prices, supplies and demands into a balance, and that balance will achieve the greatest benefit to society. Smith is also credited with the famous metaphor of the invisible hand, in which he is purported to have argued that each person, by following only his own self interest, is "led by an invisible hand to promote an end which was no part of his intention". These claims, except possibly the first, are mostly nonsense.

Smith did argue that sometimes free markets and free trade would produce results beneficial to a whole society. However he did not argue they are always of benefit. Nor was he railing against any and all government involvement in markets. What animated Smith was mercantilism, which was an unholy alliance of big merchants and manufacturers with government to create monopolies in trade with various parts of the world, such as The East India Company, The Hudson Bay Company and the Massachusetts Bay Company. Smith argued that when trade was monopolised in this way it bred corruption, colossal inefficiency, exploitation and poverty of colonials, neglect of the needs of the common people of England, and great expense for England, particularly when England was drawn into wars to extend or defend colonies[7,21,22]. He argued that trade, peacefully conducted for the mutual benefit of traders, could be a useful adjunct to the primary activities of a nation, which were domestic agriculture and domestic manufacturing.

The famous invisible hand metaphor occurs almost as an aside in a passage arguing that the self-interest of the entrepreneur would usually lead him to prefer investing in the domestic market rather than abroad. The full quote is[21]

> By preferring the support of domestic to that of foreign industry, he intends only his own security; and by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention.

This is hardly the manifesto for free markets, free trade and globalisation that Smith is claimed to have provided. Rather the reverse.

According to Schlefer[21], among those most responsible for this misrepresentation are the famous economists Paul Samuelson and William Nordhaus. Their textbook *Economics* has been the leading text since the 1950s, and in it they cherry-picked words from Smith and rendered them as

> Every individual endeavors to employ his capital so that its produce may be of greatest value. He generally neither intends to promote the public interest, nor knows how much he is promoting it. He intends only his own security, only his own gain. And he is in this led by an invisible hand to promote an end which was no part of his intention. By pursuing his own interest he frequently promotes that of society more effectually than when he really intends to promote it.

This makes it sounds as if Smith was saying that the interest of society is *always* promoted by people pursuing their self-interest. This is the claim of modern free-market economists, but it was not Smith's claim. When he did argue for freeing-up trade, he was arguing for freeing it from interference by *big business*.

The parallels between eighteenth century mercantilism and the giant transnational corporations and predatory globalisation of the past several decades are obvious. Smith would no doubt have railed against them too. He has been grossly misrepresented, to the point of essentially reversing a key message of his great work.

However the rich and powerful like nothing better than to be told that the best thing they can do for the world is to make more money as fast as they can. So anyone who shows up proclaiming this message will get a warm welcome, and their fortunes very likely will prosper.

Let us grant that Adam Smith did invent the invisible hand metaphor, and that he did argue that *sometimes* society can benefit from people pursuing their self-interest. The latter idea has proven to be irresistibly seductive to many people ever since, so much so that they have sought to argue that it is always true. The modern idea is that the interactions of buyers and sellers in a marketplace work to regulate prices and keep them at reasonable levels. So long as there are several sellers of apples, a buyer can compare prices and quality and buy from the seller they think offers the best value. If Con the apple vendor's prices are higher than others, or his apples are of poor quality, buyers will go elsewhere. If Con wants to sell his apples he will have to reduce his prices until buyers judge the value for money to be worthwhile.

The modern idea goes further, by arguing that not only do free markets ensure a benefit to society as a whole, but that they ensure that prices are optimal. By this it is meant that the optimum prices give the most output from the least work. Loosely speaking, if prices are too high then sellers will spend their extra income on unnecessary luxuries, so some of their buyers' hard-earned wealth would be dissipated on frivolities. On the other hand if prices are too low the sellers would not be able to function properly and would not work efficiently. At the happy medium, sellers get just enough income to work efficiently and live a dignified life, while buyers spend no more than is necessary on those items and can therefore devote additional income to other necessary items or worthy activities. The more general statement made these days is that free markets ensure capital is expended in a way that ensures the *maximum possible benefit* to society. That is a large claim.

I have described the free-market idea in terms that would apply to farmers selling their produce at a village market. I did so because in the context of a village market it has a certain good sense. In fact if there is a farmer's market or a produce market in your area you can visit it and participate in these interactions yourself. However Smith also wanted to understand why the industrial revolution was increasing the wealth of England so strikingly and so rapidly. This was and is a very good question. To investigate it we need to look at broader contexts than a village market, and to ask whether the invisible hand might still operate in the context of the modern global industrial system.

At the farmer's market you can walk from stall to stall comparing the prices and quality of the apples, so your choice of apples can be well informed. On the other hand if you want to buy a car you can go around the show rooms, kick the tires, listen to the salesmen and test drive a car, but you would be wise also to buy a magazine that has reviews and comparisons of cars and car types. Even so, the information you had about a particular car would be far less than you would need for reasonable certainty in your purchase, because a car is a complicated device. If you want to buy a house the risks are higher. You may contract someone more expert than yourself to inspect it, but there will still be a risk that you could get an unpleasant surprise when you move in. Then again you might go to the supermarket and put several small household items in your shopping basket, but you don't have the time to carefully check each one, and you can't really test them properly until you get home.

The point, obviously, is that many products today are so complicated or so numerous you can't possibly evaluate their worth with any great certainty. Surely all of us will, at some time, have purchased things that failed to live up to the sellers' claims about them. Economists do acknowledge that information about a product can be incomplete or inaccurate, and they call it a market failure, but they consider this to be only a minor problem, and the market overall to be not perturbed far from the optimal performance supposedly assured by the invisible hand. However their confidence is not based on any clear theory. In fact theory and evidence are decidedly unfavourable to it, as we will see.

We can take this enquiry into another realm and suppose you want to buy shares in a company. You may get as much information as is reasonable, but if it's a large corporation almost nobody, not even the CEO and the board of directors, can have detailed knowledge

of all its operations, and of the operations of its many competitors. Anyway most share trading is not even done by individuals, it is done by managers of large investment funds, and they may trade many millions of dollars worth of shares in many different companies, all in a morning's work. Obviously they can know next to nothing about the actual operations of the companies whose shares they so blithely buy and sell. Their decisions are only marginally affected by the activities of the company. Rather, the traders often are looking at such things as whether the market is rising or falling, whether a company's share price is rising or falling and what relevant decisions by political or monetary authorities may be imminent. Since the other traders are doing similar things for similar reasons, what is really happening is that traders are watching each other. That's one reason why the stock market gyrates up and down so much, because traders are rushing here and there in large groups, like herds of wildebeest responding to lions' roars and seasonal migration urges.

If share traders' decisions are affected by so many factors other than the actual operations of a company, do share prices really reflect the value of the company? Most economists still insist they do, but evidence to the contrary is well-known, if not widely recognised. In October 1987 share prices worldwide fell by thirty to forty percent within a single day. There was no significant change in the operations of most companies on that day. Thirty percent of them had not gone bankrupt overnight, nor been bombed, nor otherwise ceased operations. There was no change in the real world of commerce. Rather, the change was entirely in the minds of the stock market traders, who suddenly decided the companies were worth a lot less than they had thought the day before. So apparently the traders got the values wrong by thirty or forty percent. They were not well-informed, and the market only very loosely reflected real values.

The champion traders are those who convert money between national currencies. The volumes of currency trading are mind-boggling. About $4 trillion a day is transacted in the global capital markets, according to the Bank for International Settlements. About four days' trade equates with US GDP for a year, and about two weeks' trade equates to the world's GDP. To put this in some perspective, the relative values of national economies and their currencies may change slowly over years or decades. To take account of this, the shares and currencies should need to be traded no more often than, say, every three years, which is 150 weeks. However the actual rate of trading turns everything over about seventy five times during that period.

Thus only about one in 75, or 1.3 percent, of the trades are performing a useful service for the productive economy. The other 74 out of 75, or nearly 99 percent, are speculation, meaning they are sophisticated gambling meant to skim tiny fractions from vast amounts of money and make the "players" very rich. Needless to say the players' knowledge of the real value of the entities they are trading is necessarily miniscule. In other words, the vast majority of currency trades, and a great many stock market trades as well, have nothing at all to do with the village market, with an invisible hand ensuring the optimal functioning of commerce. Rather, the speculation is parasitic. Worse, it is highly destabilising, because traders move in herds and prices are so disconnected from real-world values they fluctuate rapidly over large ranges.

Every now and then the fluctuations turn into a market crash, the most infamous of which was the stock market crash of 1929, which ushered in the Great Depression. We were assured that such a thing could never happen again because economic management is so much more sophisticated today. Yet we had the market crash of 1987, the Asian currency meltdown in 1997, the collapse of the Japanese housing bubble, the collapse of the dot-com boom, and the subprime lending crisis in the US, which quickly developed into the Global Financial Crisis and the worst recession since the Great Depression. There have also been major national collapses in Mexico and Argentina, and Brazil came perilously close to a collapse.

The essence of the invisible hand idea is that individuals pursuing their own self interest can, without any intention to do so, produce a net benefit to society. But what if everyone's pursuit of their self interest were to make everyone worse off, even perhaps in spite of their best efforts or wishes to the contrary? Could such a thing ever come to pass? If you hold shares in a company and the market is falling, you might decide you have to sell your shares to protect your own self interest. However by doing so you will tend to push the share price down further. If everyone else is also trying to sell, the share price can go into free fall, and almost everyone may get a much lower price than they wanted or expected. In this case the individual pursuit of self-interest produces what nobody wanted - a market crash. It makes everyone worse off. It yields a net detriment to society, even though it was "no part of the intention" of anyone. Not only does the invisible hand sometimes take a holiday, but sometimes individual actions combine in exactly the opposite way. Some people call this the invisible foot.

It should hardly need saying that market crashes are extremely disruptive, except that apologists always minimise the damage, and claim they are rare events. In 2011, Alan Greenspan, former Chair of the US Federal Reserve and one of the chief architects and defenders of unregulated financial markets, wrote in effect that deregulation worked wonders, apart from "notably rare exceptions such as 2008"[23]. I was able to list above eight such "rare" events that have occurred within the past three decades. Perhaps we should be grateful they are not what Greenspan would consider frequent.

We need to be clear about the damage caused by market crashes. They cause bankruptcies, unemployment, poverty and serious hardship and have set off chain reactions that, among other things, promoted Hitler's rise to power and threw Japan into a recession it still has not properly recovered from. In economists' dry terms, these "imperfections" in markets cause major inefficiencies in national economies. The invisible hand seems to have fits of rage.

Before we leave Adam Smith it is worth noting that he was also the author, seventeen years before his more famous *Wealth of Nations*, of a book called *Theory of Moral Sentiments*. In the earlier book he writes of trust among familiar people as being necessary to discourage cheating and for the good functioning of society. He detested great concentrations of wealth and privilege and saw his insights as a means to prevent them from developing. He certainly did not imagine that the functions of commerce should override social and moral values. Thus modern advocates of unfettered markets who invoke his name to justify their narrow ideas merely reveal their ignorance. Nor do

opponents of modern capitalism need to vilify Smith, as he was a considerably more moral and balanced person than some of those who take his name in vain.

There are other ways in which attractive idea of the invisible hand fails to survive the translation from a village market to a modern economy. For example, in a largely agrarian economy of small family farms it is hard for any farmer to escape the discipline of the village market and gain advantage over other farmers. A farmer might work harder or manage better than his neighbours and therefore be modestly wealthier, but he will not be able to expand his market share to the point of driving other farmers out of business. This point was developed in the nineteenth century by John Stuart Mill in his discussion of diminishing returns. Even if a farmer is able to undercut his neighbours' prices there is only so much he can produce. He may bring more land into production, but he would have been using the best land already, so the new land will not be as productive. If he employs extra farm hands they are unlikely to be as motivated and productive as he is.

Contrast the small farmer's situation with that of Henry Ford. Ford perfected the assembly-line production of cars, and assembly lines are recognised for yielding economies of scale. Once you have the assembly line set up, the more cars you produce the lower is the cost per car. This means that if you can undercut your rivals you will sell more cars. But if you can do that then you can lower your price further and undercut your rivals even more, and so on until you take over a significant fraction of the market. At one stage Ford's Model T accounted for 50% the car market. The situation is even more extreme with modern computer technology. Microsoft dominates the market in computer operating systems and Intel dominates the market in computer processors. Ford, Microsoft and Intel were able to dominate their markets because of economies of scale: the more items are produced the lower is their average cost. Obvious economies of scale operate in most manufacturing industries, and company managers routinely factor them into the calculation of production runs and product prices.

Moreover economies of scale are a lot more widespread than just in manufacturing industries. Economies of scale can also result when people learn from experience – the so-called learning curve effect – and that happens just about everywhere. It's a surprisingly regular effect, first noticed on aircraft assembly lines: the time people take to complete a task drops by around 20% for each doubling of the total number of items produced. This creates an economy of scale because the biggest company, meaning the company making and selling items the quickest, learns faster, and its production costs decline faster than its competitors' as a result.

There have been many studies of learning curves by management consultants, and there is *no* industry in which the effect has been sought and not found[24]. Even in John Stuart Mill's favoured ground of farming, industrial agribusiness is proving economies of scale can be found. The learning curve applies in both labour-intensive and capital-intensive industries. It has been found in an astonishing diversity of industries, a few examples being semiconductors, life-insurance, steel, beer, facial tissues, knit fabric, air travel, hydroelectric power and typesetting. It also seems to apply to all cost components

of a business, including overhead, advertising, research, engineering, marketing, supplies purchasing and labour.

The pervasiveness of economies of scale has a simple and fundamental implication. The biggest firm can undercut its rivals and grow at their expense. It's a recipe for monopoly. Evidently it works, because today many industries are dominated globally by only a few companies. The only reason a company doesn't achieve complete monopoly is that there are usually some less profitable niche markets for smaller companies to occupy. By the nineteen nineties only five firms accounted for more than fifty percent of *worldwide* business in each of the automobile, airline, aerospace, steel, electronic components, and electrical and electronics industries. Ironically, some agricultural industries were even more concentrated, with three firms accounting for more than eighty percent of business in the marketing of bananas, cocoa and tea.

The well-known problem with monopolies is that they can charge whatever they like because there's no-one else to undercut their prices. Even a firm that controls, say, thirty percent of a market has a lot of power over its prices and costs. It can intimidate its suppliers into reducing their prices by threatening to cut off their business. It can target small rivals one at a time by undercutting them in their own area. It can buy influence with politicians. Large global corporations are so large they can intimidate whole countries. So once a market becomes dominated by only a few companies there is no assurance that the invisible hand will be able to control it.

There are still other ways in which the invisible hand can be rendered ineffectual. If Con the apple vendor can persuade people to prefer his apples because a celebrity endorses them, then he will sell lots of apples, even if he charges a premium for them. There are many examples, such as Nike paying basketballer Michael Jordan a fortune to endorse its sports shoes. People will even buy things just because everyone else is buying them. It is every marketer's dream to trigger this response, and some of them succeed fairly often, witness the crazes that regularly sweep the children's toy market. Free marketers don't consider that people can be so irrational.

If there are such obvious difficulties with assuming the operation of the invisible hand of free markets in large-scale modern economies, why has the idea persisted at all, let alone become the dominant human organising principle of the planet? There are two reasons. The first arises from something I said near the beginning of this chapter. According to Smith the invisible hand arises from people pursuing their own self interest. This idea has a powerful appeal to the wealthy, who would like nothing better than to be told the best thing they can do for the world is to keep making money as fast as they can. The second reason will seem strange to most normal people. It is that you can do elegant and sophisticated mathematics if you assume Smith was right.

Not a lot needs to be explained about the first reason. The words of Gordon Gekko, in the 1987 movie *Wall Street* are as eloquent as is required:

> The point is, ladies and gentlemen, that greed—for lack of a better word—*is good*. Greed is right. Greed works. Greed clarifies, cuts through, and captures the essence of

> the evolutionary spirit. Greed, in all of its forms—greed for life, for money, for love, knowledge—has marked the upward surge of mankind.

It may not be coincidence that Gekko's name sounds like a reptile. A sufficient commentary on this mindset is provided by John Kenneth Galbraith's wry observation that, according to free marketeers, the poor don't work hard enough because they're paid too much and the rich don't work hard enough because they're not paid enough.

The second reason for the persistence of the idea does allow for some explanation, though I'm afraid I can't explain the allure of clever mathematics to those who don't already feel it. Suffice to say that some people like that sort of thing, and many of them have been attracted to a line of mathematical theory that began late in the nineteenth century. At that time some of the followers of Adam Smith had a severe case of physics envy. Newton had discovered a universal "law" of gravitation that described everything from falling apples to orbiting planets, and they longed to discover a universal law that governed the functioning of society. Prominent among them were Leon Walras in Switzerland and William Stanley Jevons in England. They and others developed a theory in which they could prove mathematically that simplified people, just by trading among themselves, brought about the kind of optimum result that Adam Smith's work had suggested a century earlier. In the restricted theoretical world of the mathematical theory everything comes to an equilibrium in which supply meets demand in all market segments and the greatest output is accomplished with the least input of work and capital. The theory has become known as the *General Equilibrium* theory.

Actually the economists didn't so much develop the theory as borrow it from physicists, who had an analogous theory that a gas made of simplified atoms bouncing off each other would come to an equilibrium state of uniform pressure and temperature. Nevertheless the general equilibrium was a bold theory and a striking result. The trouble was the economists didn't properly learn their lesson from scientists, and didn't do what the physicists did with their theory of bouncing atoms, which was to compare it with measurements of real gases. The physicists found that their theory reproduced the behaviour of hot gases quite well, though it became less accurate for a gas near its condensation temperature, where the gas turns to liquid. They also knew it was hopelessly inaccurate for describing the behaviour of liquids and solids. It turned out later this is because the interactions between atoms in liquids and solids are quite complex, and have to be described by the theory of quantum mechanics. The interactions between people are quite complex too.

Instead of checking their theory against reality the mathematical economists became infatuated with its mathematical beauty and power. They imagined that because it was mathematical it was scientific. They overlooked the fact that in science you check your theory against reality, no matter how clever the mathematics might be. Leon Walras even went so far as to claim he didn't need to check his theory against reality, because the assumptions upon which it was built were (to him) obviously true representations of the world, and his mathematics was also correct, so his result must also be a true representation of the world.

Over a century later the infatuation has not been broken, despite the problems with the invisible hand mechanism that we have already covered, and others I will shortly describe, and despite the fact that some of these difficulties have been proven (mathematically) by economists themselves. On the contrary, the General Equilibrium theory has been greatly elaborated, it is assumed in virtually all computer models of the economy, and it dominates and channels the thinking of the vast majority of mainstream economists. It has become one of the most powerful memes in the world.

The General Equilibrium is the central result of a body of work known as the neoclassical theory, *neo* because it revived the ideas of Smith and some others, and because the earlier ideas are known as *classical* theory. Mathematical theories start from a set of assumptions that can be expressed in mathematical form. The assumptions are the theorist's best guess about how the real world actually works, or at least the best compromise between realism and mathematical tractability. Once the assumptions are set, the rigid logic of mathematics determines everything that will be deduced from the assumptions. Thus, in constructing theories, it is critical that the assumptions are some reasonable approximation to the real world.

Often, when building a theory, it is necessary to make the founding assumptions simpler than we know the real world to be. This was especially so before computers became available, because mathematical methods could only handle certain types of problems. There is thus some judgement and art involved in constructing a theory. The goal is to capture as much of the real world behaviour as possible while keeping the mathematics tractable. The test is the resemblance of deductions from the theory to observations of the real world. A good theory is one that provides useful guidance to the behaviour of the real world. (Notice that I haven't said anything about "truth".) Milton Friedman[25] once greatly confused this issue by claiming that a theory could be built on obviously wrong assumptions, so long as some of the deductions resemble the real world. Many economists seem to have taken this to mean that assumptions don't matter. This is nonsense.

The neoclassical theory requires quite a few assumptions. Among the most important is that people are rational and will buy those things that represent the greatest value for money. To do so people must have full information about value, and about prices elsewhere in the market. People's purchases must not be influenced by what anyone else is buying. Nor should one market transaction affect another market transaction; textbook examples of this are the bee-keeper, whose activity affects and is affected by flower growers, and the fisherman, whose livelihood can be affected by factories that pollute the ocean. Producers should pay the full costs of production, including costs of avoiding affecting others, for example through pollution. There should be no economies of scale, beyond an ill-defined "point of diminishing returns".

Economies of scale are worth some more discussion, because they lead us most easily to fundamental implications. Some economies of scale are allowed in the neoclassical theory, but only up to a point of diminishing returns. It is necessary to assume that any economies of scale that might exist for small firms decrease as they grow and eventually

become diseconomies of scale, so that the bigger the firm the greater its costs per unit of production. John Stuart Mill's small farmer who brings less fertile land into production is encountering diseconomies of scale. This assumption is necessary to ensure that one firm does not grow without limit, by undercutting its smaller rivals, and come to dominate the market as a monopoly. Not often stated here is that the point of diminishing returns should be encountered before firms become too big, so that plenty of firms will be left to compete in the market to ensure the operation of the invisible hand.

The existence of the point of diminishing returns is why you have plenty of choice in the operating system you will run in your computer, and plenty of choice in the processor it will use. I'm joking. If there is a point of diminishing returns for computer operating systems, evidently Microsoft has not yet reached it. Microsoft has only two rivals worth noting in this field, Linux and Apple, and both are much smaller. Intel is even more dominant, as is supplies the vast majority of processors in computers today. As we saw earlier, economies of scale pervade most market segments. We don't have to do any fancy mathematics to figure out the implication: firms are able to grow until they dominate the market.

Thus if we use the more realistic assumption, that economies of scale are common, it leads to a quite different prediction than does the neoclassical theory. Rather than market segments in which many firms compete for your custom, we predict market segments dominated by one or a few firms. Even a casual observation of the real world indicates that many markets are indeed dominated by only a few firms.

Physicists and engineers would describe the runaway growth of one firm at the expense of others as an instability. Rather than the market segment coming to a stable equilibrium in which many firms exist to compete for your custom, one or a few firms go into unrestrained growth.

The difference between stability and instability is illustrated by the difference between a rocking chair, on the one hand, and a ball placed on top of a large globe, on the other. If the rocking chair is pushed off balance, the force of gravity pulls it back towards its balance point. Friction will soon slow the chair's rocking until it rests in its equilibrium position. On the other hand if the ball on the globe is pushed to one side then the force of gravity pulls it even further to the side. But then gravity pulls even harder, so the ball moves faster, and so on until the ball accelerates off the globe. The rocking chair comes to a *stable equilibrium*, but the ball is *unstable* and flies off into a different realm (the floor).

The neoclassical theory predicts the economy will come to an equilibrium state. However we know that in modern economies a mechanism operates to promote instabilities, namely economies of scale. This destabilising mechanism seems to operate pervasively through most of the economy. Furthermore the predicted consequence of the instability, the dominance of market segments by only a few firms, is also readily apparent throughout much of the economy. Thus when the more realistic assumption is used, that economies of scale are common, the resulting theory predicts pervasive instability, or *disequilibrium*.

Changing that one assumption destroys the central neoclassical prediction of a general equilibrium, which is the central conception of mainstream free-market theory. The foundation of the neoliberal ideology crumbles.

Changing any one of several other neoclassical assumptions also fundamentally changes the predicted behaviour of the system. We have noted already that we do not have good and timely information about the value of products, particularly in the financial markets. If information from the real world is incomplete or late, then prices will be predicted to gyrate erratically. Indeed this is what we see, especially in the financial markets.

If we were rational in our purchases there would be no marketing industry. This enormous and very successful industry is devoted to provoking us into buying impulsively or for quite irrational reasons, often related to some feeling of inadequacy that a marketing campaign has been carefully crafted to aggravate. Neither are we supposed to be influenced by what other people are buying, but if that were so there would be no fashion industry. If we are irrational and influenced by others then we are prone to herd behaviours, which can lead to instabilities. Fads and fashions are the real-world manifestation of such instabilities. Thus again the general equilibrium is lost.

Some of these difficulties are not unknown to the economics profession, in fact some of them have been proven by very prominent economists. A remarkable example occurred in 1954 when Kenneth Arrow and Gerard Debreu proved mathematically that the general equilibrium could exist in a world in which time was allowed to flow[26]. If that statement is a bit startling, so it should be. It's worth picking it apart because of what it reveals, so bear with me a little.

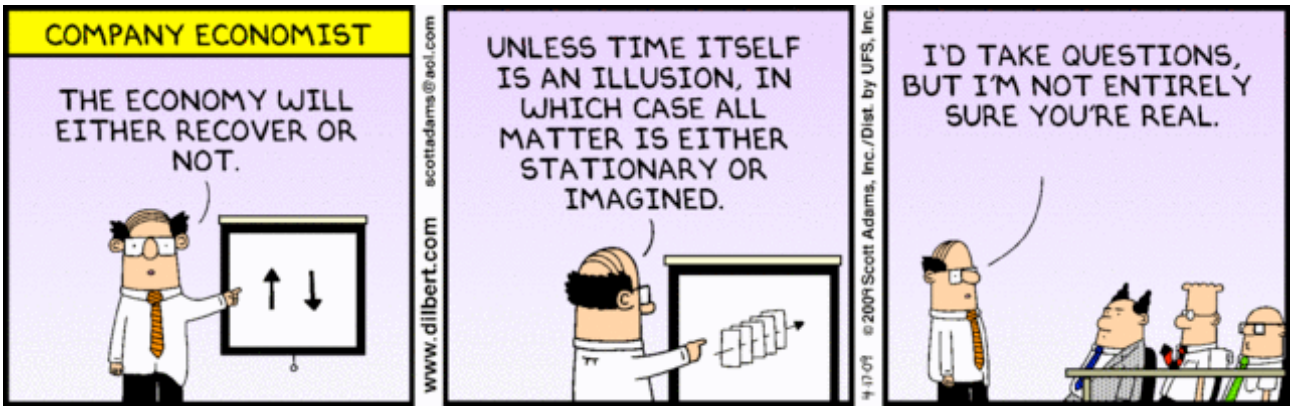
Prior to 1954 mathematical economists had only been able to prove a market would come to a general equilibrium by assuming that everyone knows what everyone else is *intending* to pay. In a village market that's not much of an issue, because whatever someone just paid is a fairly reliable indication of what they are willing to pay. However in a large modern financial market, in which prices fluctuate rapidly, traders are constantly revising what they are willing to pay, and they can't know from moment to moment what all the other traders' intentions are. The key difference is that in a financial market information is too voluminous and is absorbed too slowly by market participants to keep up with the rapid fluctuations in price. From the mathematical point of view, the difference is in the relative rates at which prices and knowledge change as time flows.

To get around this theoretical difficulty economists had, until 1954, made the clumsy assumption that everyone would wait until everyone else had stated their intended price before anyone actually bought anything. It was as though an imaginary auctioneer called for everyone's bids before anyone completed a purchase. Looking at it another way, it was as though the flow of time was suspended until everyone knew everyone else's intention. That this was a clumsy artifice was evident even to economists, and so it was regarded as a great triumph when Arrow and Debreu proved the general equilibrium could exist even if time was flowing. However there was a catch. People had to be able to form rational expectations of the future, which means they could assign reliable probabilities to whether future events would come to pass. Do you know anyone who can do that? I don't. We

might make educated guesses, but life has fickle a way of surprising us. However the people in this imaginary economic world could reliably foresee the probabilities of future contingencies. The effect, mathematically, was to telescope the future into the present, by bringing future events out of the great unknown and into the known.

You might be thinking at this point that Arrow and Debreu had spun off into *la-la* land, rather like the medieval ecclesiastics who debated how many angels could dance on the head of a pin. However that was not the response of the economics profession. Arrow and Debreu were awarded the Nobel prize for "saving" the general equilibrium.

Things only got worse after that. Arrow and Debreu had to assume that everyone had the *same* expectations of the future. In 1968 Roy Radner, in an even greater display of mathematical machismo, proved that the equilibrium could still exist even if people had different expectations of the future – but only if everyone had access to infinitely powerful computers.



OK, enough. Time flows and the future is unknowable, and we all have to live with that. To real scientists the lesson is that in real modern markets information can be delayed, as well as being seriously incomplete. Physicists and engineers know what delayed and weakened feedback can do. A system that was stable with fast, complete feedback (like a rocking chair) can become unstable and erratic if feedback is slow, or weak, or both. It means, again, that there is no assurance the market will come to a general equilibrium. That means in turn there is no assurance that free markets will yield an optimum result. We can even readily observe evidence for sub-optimal performance, because the erratic gyrations of financial markets degrade the performance of the productive economy.

The implication of this analysis is quite fundamental to the current global regime. There is no theoretical basis for the claim that free markets ensure the most efficient use of resources. Neither is there any observational basis, according to the evidence presented in the previous chapter. There is no assurance at all that free markets will deliver what we want, let alone deliver it efficiently.

The neoclassical theory is, first of all, a mathematical construction. To be the basis of a scientific understanding of economies, it must be demonstrated that the theory captures

important aspects of real economies. The criterion for a good scientific theory is that it provides a *useful* description of, or approximation to, the observable world. This the neoclassical theory manifestly fails to do. The central theory of modern free-market economics, a theory that has spawned one of the most powerful memes in the modern world, bears a superficial resemblance to a scientific theory but in fact fails the basic criterion that would qualify it as useful science. Superficially it looks like science, but it is not. In other words, it is pseudo-science.

Our societies are possessed by a dysfunctional meme, a myth. We are as the Mayan temple builders and the Easter Island statue carvers. We pursue our obsession as the signs of impending disaster grow by the day.

4. Wild Nature

Prior to the twentieth century, science had built up a picture of the universe as a giant clockwork. Starting with an investigation of mechanics by Galileo, a series of "laws" had been inferred, and these laws were extremely successful in describing the physical world. It seemed that the world had been reduced to causes and effects that were precisely known, and therefore it would tick inexorably along according to those laws. This view was very discomforting to philosophers and theologians, among others, because it seemed to eliminate free will, and to imply that our fates were all sealed at the beginning of time. The neoclassical theory of free markets is firmly of the clockwork universe kind.

However science underwent three revolutions during the twentieth century, revolutions that profoundly changed scientists' views of the universe. Everyone has heard of quantum mechanics and relativity, but it is the third, least-known revolution in systems science that has more immediate implications for our everyday lives. The recognition of self-organisation, complexity and chaos makes clear why living things seem so different from the inanimate world. The new view also accords better with our experience of life, which is not predictable and therefore requires choices, and the free will to make them. Because economies arise from living human societies, we must appreciate the lessons of the third revolution if we are to gain a useful understanding of economies.

A much older attitude is also woven deeply into mainstream economics. For at least the last several thousand years the predominant Western view has been that nature is a foe to be conquered, dominated and used. This view finds expression, among many other places, in the Christian Old Testament, in Plato's contemplation of abstract ideals versus imperfect reality, and in Descartes' explicit separation of the pure realm of thought from the corrupt world of the flesh.

Economists' attitude to global warming is a direct manifestation of the continuing influence of this world view. Until very recently economists were nearly unanimous that reducing our emissions of greenhouse gases would disrupt economic growth and therefore should not be undertaken until there was near scientific certainty that we are the cause of global warming. It took decades of arguing by scientists, that the risk of global warming is high and the consequences potentially catastrophic, to get to the point where one prominent economist, Sir Nicholas Stern, was willing in 2007 to argue that the cost of *not* reducing our emissions is likely to be substantially greater than the cost of reducing them. This reluctance by economists is an expression of the mainstream economics worldview, in which the environment is an expensive luxury, something you attend to

after you have got the economy to grow some more. Always some more. We never seem to be quite rich enough to make the environment a high priority, it is just one more call on budgets, like roads and hospitals.

The problem is that, in the mindset that currently dominates the planet, "the environment" is something *out there*, something external, not part of the important *real world*. If you live and work in very tall towers in the middle of a very large city doing things that involve lots of money, and so are regarded as very important, then *the environment* must seem rather abstract, and perhaps a bit scary. Better to remain remote from it and to contemplate it only as a *resource*. And a dump. Such attitudes are the modern expression of the old Western view that nature is a foe to be conquered, dominated and used.

Yet in the United States, a country borne of Descartes' Enlightenment and where Christianity is prominent and many people are committed Christians, fully *two thirds* of adults agree that humans are part of nature, and three quarters agree we have a moral duty to protect and preserve all God's creatures. Two thirds of adult Americans agree we will destroy our environment if we don't change the way we live. Two thirds are concerned their children will inherit a degraded world, and four fifths agree we should change the way we live now so future generations can enjoy a good quality of life. *Nine tenths* of Americans think economic growth and protecting the environment should be compatible[27].

Even those who hold such views do not realise they are so widespread. This is because our public discussion is dominated by the official view that the environment is a resource, and people feel embarrassed and afraid to say what they really feel. Their real views only emerge when they come to feel comfortable and safe during in-depth interviews and within focus groups.

In contrast to the dominant modern Western view, an appreciation of our dependence on nature is widespread among indigenous cultures. A common ethic among native Americans is that one should take only what one reasonably needs, and one should leave the world in at least as healthy a state as one found it. Australian aborigines commonly regard their ancestral land as integral to their identity. Their spirits lived in the land before they were born, and return to the land after they die. To disturb a sacred site is to put at risk one's core identity. Other traditions also recognise respect for nature and our interdependence with nature. The book *Small is Beautiful* by E. F. Schumacher[28] is an expression of a Buddhist ethic that an abundance of material things is not required for, nor conducive to, a good life. Taoists gleaned deep lessons on the conduct of a good life from close observation of nature.

Science also now leads us to the view that we are dependent on nature, and a part of it. The new scientific view is at least as clear as many philosophical or religious views. This may be surprising, given that scientific discoveries have for the past several centuries abetted and accelerated the exploitation of nature. However the systems science revolution presents us with a very different view of living systems than that of traditional Newtonian science. It is a view that calls for a fundamentally different relationship between economics and the natural world.

A central idea that has emerged from systems theory is ... *emergence*. The idea is that a new kind of behaviour can *emerge* from a system comprising many interacting parts, even though the individual parts are not capable of the behaviour. A simple example is a Mexican wave, popular with stadium crowds. When a Mexican wave comes around a stadium, your job is to sit until it arrives, stand or jump as it passes around you, and sit again once it has passed. The wave is simply the collective effect of everyone doing what you just did. There are a couple of notable things about a Mexican wave. One is that you can't do it by yourself. It can only be done by a large crowd. The other is that everyone in the crowd must be able to see what everyone else is doing, or at least those nearby, so they can get the timing right, keep the movements coherent, and generate a wave of actions, rather than a lot of random jumping up and down. In more technical terms, signals carrying information must be able to pass among the components (people) of the system (crowd). In this case the signal is the light that allows you to see what others are doing.

Emergence is the result *self-organisation*, another basic concept that has come out of systems science. A stadium crowd can self-organise to produce a Mexican wave, but self-organisation can occur with no intelligent guidance, and even in inanimate systems. In fact self-organisation is a commonplace phenomenon, easily recognised once you're alert to it. Wind-driven waves on water, ripples on sand and patterns in clouds are examples. As wind blows over sand, any small bump in the sand tends to collect blowing grains of sand on its lee side, whereas grains tend to be swept up and over the windward side. The result is that a pattern of ripples grows across the surface of the sand. No external agent needs to plan it, it happens purely through the physical interactions between moving air and grains of sand. The air and sand self-organise, and the ripples *emerge*.

Self-organisation has been observed in chemical systems as well[29], and exploration of this has revealed an intriguing path that may lead to life[30]. There are some chemical reactions that proceed through a sequence that ends up yielding one of the chemicals that began the sequence. This means the sequence can repeat. Such a repeating cycle is called a *catalytic cycle*, and Figure 4.1 shows a schematic illustration of one. If a chemical 'soup' of many kinds of molecule includes some components that can form such a cycle, the cyclic reaction can become self-reinforcing, because the more of its components are produced the more there are to initiate another cycle. The result is that the components of the cycle become the most abundant, because they are produced at the expense of other possible products.

Without the operation of catalytic cycles a very large number of chemical products might have been possible. However the self-organisation induced by a catalytic cycle results in only a few products, the ones that are capable of participating in the cycle, because the cycle uses up most of the raw materials and starves the other possible reactions.

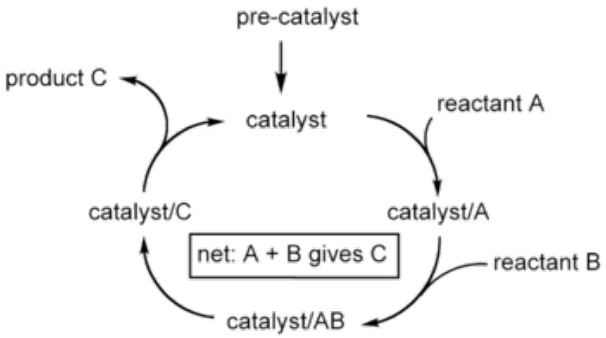


Figure 4.1. A catalytic cycle, in which a catalyst is repeatedly regenerated, so it can continue to promote the reaction of components A and B to yield C.[31]

One of the great puzzles about life is that a living cell is an assembly of very special molecules in very particular relationships. Given that much of the universe seems to degenerate into randomness, it seems impossibly unlikely that the components necessary for rudimentary life would ever come together. Catalytic cycles provide a mechanism for generating a particular small group of chemicals, rather than a random soup.

The element carbon is very special, chemically speaking, because its atoms can combine into a bewildering variety of molecules. The main reason for this is that it can form into chains of carbon atoms, with other kinds of atoms, like oxygen and hydrogen, attached along the sides of the chain. The carbon chains can form branches, and they can even close into circles, as is illustrated in Figure 4.2. There is an almost unlimited number of ways carbon chains can branch and loop and link, and an almost unlimited number of combinations in which other atoms can attach along the chains.

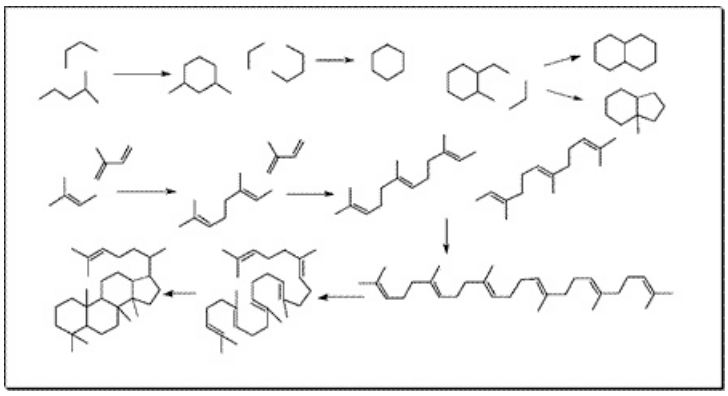


Figure 4.2. The "erector set" quality of carbon chemistry.[32] Each line represents a bond between carbon atoms, which are implied at the intersections of the lines. An endless variety of chains and loops can be formed.

Now some carbon molecules can react in catalytic cycles, and the more complicated the molecules the more likely they are to form catalytic cycles. Since catalytic cycles also tend to produce more complicated molecules than they start with, the result is that ever-more complicated molecules can be generated.

Living organisms are made of carbon molecules of many different kinds. We have known for a long time that carbon was capable of very complicated chemistry and that this must have something to do with the existence of life. Only in the past few decades, however, has growing knowledge of catalytic cycles led to the realisation that they might lead to an accumulation of ever-more complicated carbon chemistry that might ultimately become a living cell. This would involve not just one level of self-organisation and emergence, but probably many levels, each level giving rise to new kinds of emergent behaviour. It is thus possible to conceive how something with the vast complexity of a living cell might have originated from inanimate materials through many levels of self organisation[30]. In any case, regardless of how life began, the modern understanding of biochemistry makes it clear that living organisms are vastly sophisticated examples of self-organising systems.

In fact living organisms are examples of *complex* self-organising systems. Some kinds of self-organisation produce fairly simple patterns, such as sand ripples, whereas others produce quite complicated patterns, such as many types of clouds. Whether the system produces simple patterns or very complicated patterns depends basically on how strongly the components of the system interact: roughly speaking, weak interactions yield simple patterns and strong interactions yield more complicated patterns. There is a threshold of interaction beyond which patterns become so complicated they amount to chaos, which has no pattern at all. Weather systems are chaotic in this sense, which is why weather forecasting is so difficult.

Just short of the threshold of chaos, at *the edge of chaos*, the behaviour is not chaotic, but neither is it simple or steady[33]. Rather the behaviour has a kind of shifting order. There are patterns but they don't persist. Small changes are happening all the time and every now and then there is a large change. This range of behaviour has been called *complexity*, to distinguish it from its relative *chaos*. It seems that living systems operate in this edge-of-chaos borderland occupied by *complex self-organising systems*.

An important feature of complex and chaotic systems is that their behaviour is unpredictable in detail. Chaotic systems behave erratically, as their name implies. The reason is that they spontaneously generate internal instabilities. A familiar example is a pot of boiling water. The water is stirred erratically by bubbles of steam that form and rise. The formation of a bubble is an instability in the state of the water. The precise location of each new bubble depends on tiny fluctuations in the state of the water, and is therefore not predictable. Because the location of new bubbles is unpredictable, and the growth of a bubble is an instability, the motion of the boiling water is essentially chaotic.

A defining feature of a chaotic system is that any slight disturbance at one point in time will be magnified as time passes until the detailed behaviour of the system is quite different from what it would have been, had the disturbance not occurred. The internal

instability (the growth of bubbles in our example) does the magnifying. In other words, the system is hypersensitive to slight perturbations which will direct it onto a new path of development.

Chaotic systems are always hypersensitive in this sense. The famous metaphor for this is that the tiny eddy caused by the flap of a butterfly's wing in the Amazon might grow into an Atlantic hurricane two weeks later. We could only predict the detailed course of a chaotic system if we had infinitely precise knowledge of its components at an instant of time. Since in practice we never have infinitely precise knowledge of anything, the behaviour of a chaotic system is not predictable in practice. This is so even if we understand very well how the system's components work. For this reason the behaviour is called *deterministic* chaos: the cause-and-effect within the clockwork is well understood, but the clock's future behaviour is still unknowable.

Complex systems are not as hypersensitive as chaotic systems. They can spend much of their time fluctuating around a relatively stable state. However complex systems can become unstable and shift into another state, and at the point of transition they become hypersensitive, so that a slight disturbance can alter the state into which they shift. A growing embryo undergoes such transitions, which are choreographed by tiny self-administered doses of signalling chemicals. A chemical intruding from outside at a crucial moment can disrupt the orderly development of the embryo. Thalidomide is a notorious example of such an artificial chemical disturbance. It caused gross deformities of babies in the late nineteen fifties when given to pregnant women to relieve morning sickness.

To summarise so far, *self-organising* systems exhibit emergent behaviour, which is behaviour that individual components of the system cannot exhibit. One person cannot perform a Mexican wave. *Complex* self-organising systems are neither random nor rigid in their behaviour. They exhibit order, but it is a shifting order. They are continuously changing, but not randomly. The changes are usually small, and the system will fluctuate around a recognisable state for some time. Physicists would call this a metastable state, one that has some limited stability but that is not immune to change. Occasionally the internal fluctuations grow, a bigger change does occur, and the system may shift into a new state with recognisably different behaviour. During such a shift, the system is hypersensitive to slight disturbances, and for this reason the outcome of the shift is not in practice predictable, even though the system is always deterministic.

This description of the behaviour of complex systems could also be a description of our experience of life: a kind of shifting order, with small changes happening all the time and every now and then a large change. It could be a description of your own life, or of the history of nations, or even of an economy.

In the previous chapter we saw that instabilities pervade modern economies. The instabilities due to economies of scale are the most readily apparent. Because new technologies often emerge, and because businesses developing such technologies can exploit economies of scale, new businesses bubble up and change the business landscape, and all the other businesses have to adjust to some degree. Therefore we can argue that modern economies are complex self-organising systems. We might expect them to be

anyway, because they have emerged from human societies, which have emerged from the living world, and living systems are complex self-organising systems.

Complexity gives us a new and profoundly important perspective on living systems, and on ourselves. It gives us new ways to appreciate the subtlety and, yes, complexity of the behaviour of living systems. It reveals why living systems have to be thought about in quite different ways from non-living systems. It explains why the social sciences have not had the spectacular success of the physical sciences in explaining the world, and why physical science is a poor model for social science. It even suggests resolutions of old philosophical questions, such as how we can experience both continuity and change, and how free will can exist in a world governed by the laws of physics. It converges with the old Taoist conception of the world, and it shows us how much a part of the world we are. I will expand on these themes as we go along.

It is probably not a coincidence that living systems exhibit complex behaviour, because complex systems combine persistence with possibility in a potent way that feeds into the process of natural selection. The *persistence* is more of general character than of detailed behaviour (think of the character of a dog compared with the character of a cat). The *possibility* arises because a complex system is capable of an extremely large number of variations in its detailed behaviour. This complexity of behaviour is ideal raw material on which natural selection can operate, and from which individuals fit for survival are more likely to emerge. It is plausible that evolution has produced such a bewildering variety of organisms on planet Earth because of this interplay of *complexity*, producing a large variety of possibilities, and *natural selection*, choosing those most able to survive.

There are striking parallels between complex systems and the old wisdom of Taoism, which arose from close observation of nature and of human affairs. The Taoist world view is probably best known for its concepts of *yin* and *yang*. *Yin* and *yang* are often characterised as the female and male principles, but the Tao view is that all things in life have opposites, or polarities, that are also manifestations of *yin* and *yang*. Other examples are dark and light, yielding and resistance, intuition and rationality, contemplation and action. In the Tao view there are times for contemplation and times for action. When the world is stable it may not be a good use of energy to try to force change, but if the world is changing, particularly if it is in crisis, then small actions may have large consequences.

Correspondingly, when a complex system is in a metastable state is not so easy to change its behaviour. However as it approaches a transition, it becomes extremely sensitive to small influences. It can be tipped into one state or another depending on slight 'pushes' in one direction or another. In the Taoist view this is the time for action, when the world is poised in crisis and only a small push is required to determine its new path. Wisdom is in knowing when to act and when to refrain from action. The most fully realised people "by their stillness become sages, by their movement kings".

The parallels between complex systems and human experience can also be traced in the more detailed modern understanding we have of ourselves and where we have come from. These parallels further emphasise the intimate connections we have with the rest of the living world.

Accumulating evidence from anthropology and molecular biology indicates that modern human beings arose in Africa around 200,000 years ago. Earlier ancestors and relatives classed as human stretch back about 2 million years, and erect and relatively intelligent apes to about 5 million years ago. Our lineage, from chimp-like apes is thus fairly well outlined by fossil evidence. The modern apes exhibit a range of social styles. Gorillas and chimpanzees are male-dominant and can be fairly violent at times. Bonobos, the smaller chimp relatives that live south of the Congo River, are more female-managed, with females ganging up on any male that threatens to get out of hand and with frequent sexual contact used as a social lubricant. Humans tend to live in small bands of a few dozen, and strong male-female pair-bonding is a persistent feature, probably to improve the care of offspring, who remain dependent for much longer than in other species.

Experimental psychologists, who test the way we think and deal with puzzles and challenges, find that we are less rational than we might like to think. We tend to pay much more attention to immediate challenges and threats than to threats that emerge slowly. We also tend to avoid a risk of losing something we already have, even if there is a very good chance we could gain much more by taking that risk. Such behaviours make sense in the context in which our ancestors lived. There is not much point fretting about a possible drought next summer if you don't notice the leopard poised to leap on you. It may not be wise to abandon some food you are carrying with you so you can cross a river, if you might drown, or if the abundant food you think you see on the other side turns out to be of a poisonous kind. In other words, we are the products of our history. We have been shaped by the world our ancestors had to deal with. If they had not evolved appropriate responses and learned to deal with that world, we would not be here.

Neuroscientists and others who study how our brains function take this further. Our brains comprise billions of neurons with many interconnections. Brains are complex self-organising systems, and the study of "neural networks" played an important role in the developing study of self-organising systems. Neurons pass signals among themselves, and the functioning of our brains seems to comprise an ever-shifting array of complex patterns. This is very different from the functioning of a computer, which takes in a signal from outside, manipulates it and returns a response to the outside. Rather, it has been proposed that our brains form patterns within themselves that correspond to patterns of inputs received through our senses[34]. In a sense the patterns amount to internal metaphors of our perceptions of the outside world. Our brains "couple" with the perceived world outside, and a metaphorical picture of the outside arises on the inside[35].

Thus, in this understanding, our perception of "reality" is metaphorical rather than literal. It is rather fuzzy, and prone to shifts as new inputs arrive that suddenly suggest a new perspective. There are visual puzzles and games that exploit this aspect of our thinking. The deeper implication of this understanding is that the way we think, our ability to think, has been conditioned quite fundamentally by our long history of living in the natural world, in wild nature.

We are connected with wild nature in a more immediate sense as well[36]. The astronomer Harlow Shapley pointed out[37], in a poetic meditation in 1967, that every atom of oxygen we breathe has passed through many other creatures, and probably other

people as well, through long eons of the lives of creatures on planet Earth. The water we drink is purified by the cycle of evaporation, rain, absorption by plants and release into a stream. Every particle of food we eat, except only a very small fraction of modern synthetic additives, comes from other living things, and returns to other living things, to be cycled over and over from one organism to another. We think our technologies have "conquered" nature, but they have not changed at all this fundamental aspect of our existence.

We remain intricately, intimately, immediately connected with the fabric of living things that embraces our planet. Every molecule of our bodies comes from and returns to wild nature. In our very thoughts we are the products of wild nature. Wild nature lives within us.

With our new perspective on living systems, our increasing knowledge of where we have come from and how we function, and our increasing appreciation of our place within the living biosphere, we can cast the old insights from Taoism and other traditional sources into the scientific form to which modern Western culture is more attuned. Think of the following points as Operating Principles of the biosphere.

Competition and cooperation. Taoism counsels that a life lived only at one polarity will be a restricted life. For a full realisation of potential we should not become stuck in an extreme, but should balance *yin* with *yang*. A widespread modern view of nature is that it is "red in tooth and claw", that it is a relentless competition, to the death. However a little reflection will confirm that the living world is pervaded not only by competition, but also by cooperation. Many examples of social species exist, notably among mammals and some insects, in which individuals restrain their selfish interests to various degrees for the sake of cooperating with the larger group. This is not incompatible with the competition for survival, or for the propagation of one's genes, it just represents a more sophisticated strategy. Evidently the individual's chances of survival are sufficiently enhanced by cooperation to overcome the sacrifice of some of one's immediate self interest.

Balance. Cooperation exists in many degrees in nature, from family groups at one end, through herding and schooling behaviours in the middle, to symbiosis at the other end. The most elaborate forms of cooperation are found in the multicellular organisms, which means all the plants, fungi and animals we can see with our naked eye. You own body is an exquisitely choreographed colony of trillions of individual cells, and those cells are descended from single-cell creatures that were free-living individuals about a billion years ago. Humans require their own particular balance between the individual and the group. Again Taoism seems to have distilled an essence from the living world: healthy living systems do not depend on competition alone, nor on cooperation alone, but balance both in varying degrees.

Connections. The connections among living organisms extend far beyond cooperating with related organisms. The Earth's living systems must long ago have become globalised. This probably occurred when there were only "primitive" bacteria, and possibly before any currently surviving kind of organism had even developed. The

reason is that every organism requires a flow of nutrients and produces a flow of wastes. It would not have taken long, on the scale of Earth's ancient aeons, for a proliferating organism to use up all of the readily available naturally-occurring nutrients and to fill the Earth with its wastes, and thus to threaten its own survival. A way through the resulting impasse would have awaited the development of other organisms that could make use of those wastes and turn them back into something that were nutrients for the first organism. We modern city-dwelling humans may have forgotten that one organism's waste is another's food, but any farmer or vegetable grower is quite familiar with the idea. They may be less familiar with the idea that their plants and animals, and they themselves, are part of a dense globalised network of connections, a living fabric embracing the Earth.

Recycling. Living systems recycle all materials. *All* materials. The carbon atoms in your body have been through countless other organisms before you. The oxygen atoms that you breathe have been breathed and exhaled by countless other animals and plants. The water you drink has been used and reused countless times. Everything that passes out of your body is claimed by other organisms for their own use, and then by others and others, until some of it is returned to a form you recognise as food. Your excretions may have passed through insect lavae, small crustaceans, bacteria, protists, grass and a pig before returning to your plate as delicious pork.

Toxins. In the scramble for survival many organisms produce substances that are poisonous to other organisms. Plants especially rely on poisons as one of their main defences. There is an arms race between plants and the digestive systems of herbivores. As plants develop more potent poisons, those that feed on them shift their metabolisms to neutralise the poison. However there is one thing that distinguishes natural poisons from human-made poisons, which is that the natural poisons degrade rapidly, within hours or days. Any organism that produced a persistent poison would soon pollute its environment. The ecosystem on which it depended would sicken, and eventually the survival of the organism itself would be threatened.

Boundaries. All organic systems, be they single cells, multicellular organisms, or insect colonies, carefully regulate what passes through their boundaries. This hardly needs elaborating in the organic context, because we know we must not ingest poisons nor lose our life blood. It bears stating only because the current economic regime is heedless of the needs of communities and nations to regulate their boundaries.

Holons. Most organic systems are also a part of a larger system. Examples are cells that make up our organs, organs that make up our bodies, individuals who make up a social system, and so on. Such organic components function simultaneously to support the larger whole of which they are a part, and to ensure the health of their own component parts. There is no such thing as abstract "freedom" in nature. Rather there is a natural and healthy tension between individual autonomy and supporting the needs of the larger entity. Arthur Koestler[38] defined a *holon* as something that is simultaneously a whole and a part of something larger. A holon has a degree of self-regulating autonomy, yet it is part of a greater whole. He called a hierarchy of holons a *holarchy*.

Unpredictability. Life is unpredictable. This is common experience as well as an observation from nature and a conclusion from the modern understanding of self-organising systems. It is therefore not sensible to try to design a completely optimal path through life: "The best-laid plans of mice and men gang oft awry" as the poet Robert Burns lamented. Sensible strategies evidently are to balance between consistency and flexibility, to be not too specialised and to be open to forming alliances with erstwhile competitors.

Some of these Operating Principles of the biosphere are imperatives, enforced by certain and probably swift extinction. Others are strongly recommended: extinction may not be certain, but is a serious risk. Among the imperatives are: recycle all materials, produce no persistent toxins, carefully manage our interactions and boundaries, be aware that each of us is intricately and intimately connected with every other living organism on the planet. Among the strong recommendations are: balance competition with cooperation (especially if you are a mammal), balance consistency with flexibility, don't become too specialised.

Economies arise within human societies. An economy is the emergent result of how the members of a society make their living. We human beings have emerged from the natural world, and we remain intimately interconnected with it. We therefore remain bound by the imperatives of the biosphere, and therefore so are our economies. Wild nature is not only *out there*, it is not only all around us, it is within every one of us, and within our societies and economies.

None of our clever technologies has in any way changed this reality. Nor does living in highly artificial urban environments absolve us from the rules, nor does our attachment to clever abstractions like economic theories move us beyond the reach of the rules. Each of us is intricately and intimately connected with every other living thing on the planet. The health of the biosphere is our health, and its survival is our survival.

Modern economies violate every one of the biosphere's Operating Principles. The implication is simple and stark: either our economies change or they will not survive. Many of us may perish with them.

This new idea, complexity, is very different from the central idea of the old paradigm, the General Equilibrium. The General Equilibrium implies stability and stasis, whereas complexity involves multiple instabilities and frequent, sometimes erratic change. The implications are manifold, and will be explored as we move along. One fundamental difference is that the old idea is about stasis, whereas the new idea is about change. You could even say, with more than a grain of literal truth, that the old idea is about death and the new idea is about life.

The ideas behind the current free-market economic paradigm arose before science had come to grips with the differences between living and nonliving things. The old scientific paradigm of Descartes and Newton was based on reductionism, a practice refined by Galileo. In the reductionist approach, a system or device is taken apart, literally or conceptually, and the behaviour of its parts carefully measured and then described

mathematically. Once all the parts have been characterised, the behaviour of the whole device or system can be predicted. The reductionist approach works brilliantly for many inanimate things, like levers, wheels, clocks and such machines. Even the behaviour of very complicated devices like aeroplanes can be predicted, with the help of computers to do the mathematics.

The great success of reductionism is what led to the view of the universe as a giant clockwork, understandable, predictable and proceeding inexorably on a pre-determined path to its ultimate fate. This view created great confusion among those involved in the developing life sciences, whose attempts to apply reductionism were not only often distasteful but also were not very productive of great insights, or at least of insights that all practitioners could agree on. However the scientific view was revolutionised during the twentieth century. The theories of relativity and quantum mechanics revolutionised physics, but it was the third and more recent revolution that is more relevant to how we live our lives. This is the revolution, not yet very widely appreciated, that flows from the recognition of self organisation, emergence, chaos and complexity.

There are two features of complex systems that require a quite different approach to their understanding. These are their *unpredictability*, and the *emergence* of new, collective behaviours that cannot occur for individual components.

The behaviour of chaotic and complex systems can not be predicted in detail, even if we know how all the parts of the system work. The unpredictability has a quite different source than in quantum mechanics: it comes about, as we have seen, because complex and chaotic systems are hypersensitive to slight disturbances. This means we must let go of the conceit that we can predict the intimate detail of how complex and living things work. We can only hope to understand their broad, general behaviour, their character. The unpredictability may be frustrating to old-style scientists and engineers, but it is reassuring to many, including theologians and philosophers, since it seems to leave room for free will. We are not just automatons. We knew that all along, but now the "scientific" counterclaim can be contradicted.

The occurrence of *emergence* also fundamentally affects how we study living systems. We cannot focus solely on *reducing* a living system to its parts. Because of emergent behaviours, we also have to study it *holistically*, seeing how it behaves when all of its parts are working together. You can't study Mexican waves by observing one person, you have to watch a stadium crowd behaving collectively. You can't study the behaviour of a mouse by taking it apart, because it will be dead. This means *the reductionist approach fails* for complex and chaotic systems. Instead, such systems exhibit the emergence of new behaviours, the common expression for this being that the whole is greater than the sum of the parts.

Both of these developments strike at the heart of the neoclassical theory, which assumes highly simplified "economic man" and which uses "representative agents" in its calculations.

The neoclassical theory of free markets arose late in the nineteenth century and it belongs firmly in the reductionist scientific paradigm that reigned at that time. It conjures up a world in which interactions are simple, instabilities are suppressed, everything is predictable and everything tends to a stable equilibrium. As we have seen already, several of its key assumptions, and also its central prediction (the general equilibrium), are contradicted by commonplace observations. It does not give a useful description of the behaviour of real economies. The theory persists only because its devotees fail to appreciate the necessity, in science, of comparing the theory with reality and of *abandoning the theory* if it fails to provide a useful description of reality. It does not qualify as science. It is pseudoscience. It is not even as good as the ancient Greek description of the universe, refined by Aristotle and Ptolemy, which yields passable predictions of where the planets will be in the sky. The neoclassical theory is pre-scientific.

A useful theory of economies will start with the fact that an economy is part of a society, and that humans and their societies are part of the living world. It will avoid absurd assumptions such as that we can have complete knowledge and that we can predict the future. A theory of economies can now draw on the concepts of self-organisation and complexity. It can also draw on a great deal of knowledge from paleoanthropology, archeology, anthropology, sociology and psychology that tells us a lot about who we humans are, where we have come from and how we work. It can take account, for example, of well-documented irrationalities in our thinking, and of well-documented tendencies for us to behave in ways that reinforce social stability rather than to behave selfishly and disruptively. (I said *tendencies*, I didn't say *laws*.)

Some economists may protest at this point, not without some justification, that each of these things *is* being considered by the more progressive thinkers in the profession. However those thinkers are still on the fringe of the profession. In any case what seems to be missing is the recognition that the old neoclassical framework has to be abandoned completely. I do not hear a rising chorus of economists protesting that the prevailing free-market ideology has no basis in theory or observation. What I hear, rather, is a steady chorus of mainstream economists defending the status quo with what can only be described as an irrational commitment to an ideology, and a scattering of less blinkered but mostly marginalised economists debating some important issues and gaining important insights, but mostly without challenging the overall framework or paradigm.

There is, nevertheless, quite a lot of exciting work being done. One substantial thread of non-mainstream, or "heterodox" work explicitly involves self-organising systems, some of which develop the kind of complexity we have been discussing. In fact Eric Beinhocker has reviewed a lot of this work, and his message is that *complexity economics* is developing apace[39]. It is addressing many important aspects of the functioning of an economy, and producing important insights. For example there are studies of why incomes and wealth are so unequally distributed, why stock markets fluctuate so much even when nothing much is happening in the real world, what drives inventory overshoots, and how our systematically non-rational behaviour contributes to or drives large-scale economic phenomena.

I will summarise a few examples from Beinhocker's excellent survey to illustrate the rich and productive seam being mined by complexity economists. There is also some important work on how nonlinear relationships among economic variables drive the business cycle. My summaries may be a bit terse and dense, but the point here is only to convey a general flavour of some of the work. More details can be found in Beinhocker's book.

First, inventory overshoot. Goods generally reach us through a supply chain that goes from manufacturer through distributors and wholesalers to retailers. It is of course important that everyone estimates the demand for goods well enough that there is not a significant oversupply or undersupply. One might think that much of the time this is not too hard to do, because demand would be fairly steady and predictable. However a simple exercise called The Beer Game demonstrates that supply chains are prone to large fluctuations. In the game, people play the role of one link in the chain, and they place orders one level up the chain based on their perception of what is happening one level down the chain. The surprising fluctuations result from the interaction of peoples' limited rationality with the time delays that are an inevitable part of supply chains. People tend to use an in-built rule of thumb, which is to fix on the first state encountered and assume it is "normal", rather than looking at the history of customer orders to establish averages and trends, or waiting until enough experience accumulates to reveal them. They also tend to get anxious waiting for their orders of stock to come through, which causes them to over-react to small fluctuations. The effect of these behaviours interacting with the time delays is that any small change in customer demand can trigger waves of over-reaction up and down the supply chain that strongly amplify the fluctuations, as seen by the manufacturer, and that persist and may never settle down. The phenomenon has been simulated many times, and it reproduces the character of fluctuations in many commodity markets. Not only does the market never settle to an equilibrium between supply and demand, it can be very much less efficient than its theoretical optimum.

Next is the puzzling fact that custom at a popular bar may fluctuate erratically with no apparent external cause. Modelling has reproduced such fluctuations and shown they can happen just because nobody knows whether other potential customers are planning to show up, and because if too many show up it will be too crowded and not much fun. Similar interactions may happen in other markets as companies try to guess what prices or products their competitors are choosing.

Fluctuations in stock prices do not correlate well with real-world events, and they do not have the random character assumed by mainstream theorists. Rather than the bell-curve of the statistical *normal* distribution, the fluctuations fit a *power-law* distribution in which very large changes, though infrequent, happen more often than if randomness applied. This distribution can be explained by the interaction of traders' orders, which follow a *students* distribution rather than a *normal* distribution, with the erratic pattern of standing orders held by the stock exchange.

Simulations in which agents can learn and adapt the rules and guidelines by which they trade also generate large, erratic stock-market fluctuations. A significant contributor to these fluctuations is that some traders go by *trends*, while others try to estimate

fundamentals. If the current trend is up, then trend-followers assume it will continue be up, and if the current trend is down they assume it will continue to be down. The presence of trend-followers amplifies a rise or a fall. A rise will continue until enough fundamentalists start selling and reverse the trend. The trend-followers then amplify the fall and cause an overshoot in the other direction, until enough fundamentalists start to buy, and so on. These classes of strategies are well known in real stock markets.

One series of simulations used simple creatures that gather and "eat", or store, sugar and spice with varying degrees of skill and varying "metabolisms". The simulations generated some basic features seen in real economies, but also some telling differences from neoclassical assumptions or claims. The creatures are imbued with simple but varied rules of behaviour and operate in a flat land that, in the first experiment, has two piles of sugar. Even in this simple version the range of "wealth" (amount of sugar stored) diverged, with some becoming rich, others poor and some starving. The wealth distribution has the same character as the real world, many poor and a few very rich. This result was magnified if the creatures could reproduce, and their children inherit both "genes", that control their simple behaviour, and wealth from parents. When spice was added, and trading of sugar for spice allowed, a market trading sugar and spice developed spontaneously, along with trade routes and even middlemen. Finally borrowing and lending were introduced and something resembling bankers developed. The trading models developed rough supply and demand curves, though they fluctuated. The average "price" tended to be near the balance of supply and demand, but only roughly. In fact it fluctuated around the equilibrium in a way well known in dynamical systems theory (orbiting an *attractor* rather than converging to a point). Furthermore there were large variations in price from place to place at a given time, contrary to neoclassical theory, because the creatures could not know all that was happening in their artificial spice world, just as real traders cannot know everything that is happening in real markets.

As I noted, these are rather terse summaries, but the point here is not to understand the details but to see what kinds of conclusions emerge from them. In all of these examples the patterns in the behaviour of the system *emerge* from the multiple interactions of relatively simple agents, or of people following relatively simple strategies. The fluctuating outputs are generated by the internal dynamics of the systems, rather than by fluctuating inputs or external signals. This is most clearly evident in the beer game, where quite small changes in customer demand can generate large and persistent fluctuations in supply. Or, for example, an agent's fate can depend much less on innate "ability" than on pure luck. The variations of wealth in the sugar-and-spice world are not well predicted by the initial propensities and circumstances of the creatures, they are much more due to chance events at critical times that set the creatures on a path to wealth or poverty. The wealthy might realise "there but for the grace of deterministic complexity go I".

Results from complexity economics already carry fundamental lessons for mainstream economics. If the rigorously restrictive assumptions of neoclassical theory are relaxed, quite different behaviours can emerge that violate neoclassical predictions. For example, delayed or incomplete information can result in erratic, large and persistent fluctuations that deviate substantially from neoclassically-estimated means and that render the system far less efficient than the neoclassical ideal. Some of the models have been compared

much more successfully with observed features of real economies than neoclassical models.

In many of these models the artificial distinction between microeconomics and macroeconomics is avoided. Mainstream microeconomics (which means the neoclassical theory) cannot be used to predict such macroeconomic phenomena as market crashes or the business "cycle" because it is a theory of stasis that has nothing to say about dynamic phenomena (despite modern economists' obsession with growth). Therefore separate theories have been developed that involve hypotheses about the aggregate consequences of microeconomic behaviour. In the complexity models, the macrobehaviours emerge directly from the microinteractions of the agents with no further assumptions required. Market crashes emerge from the way traders interact. Some of the fluctuations in supply-chain models resemble the business cycle, though they are not claimed yet to explain the business cycle, which must involve other important factors as well.

A somewhat different approach by economist Steve Keen is also worth noting. His models are explicitly macroeconomic, but they depart from mainstream models in two fundamental ways. First, they include money and debt. (You might think "Duh! How else would you model an economy?", but I explained earlier that mainstream models exclude money and debt.) Second, he assumes plausible nonlinear relationships among economic variables. I haven't stressed the point, but nonlinear relationships are essential to the development of self-organisation. He has published a model[40] in which fluctuations in unemployment and inflation gradually die away, thus simulating the period of relative stability in the 1990s that mainstream economists called, smugly, the Great Moderation. However the model suddenly develops large fluctuations that soon run out of control and generate a depression, with deflation, high debt and high unemployment. In other words without adding anything to the model, it went spontaneously from a moderation to a depression, just as the real economy has done over the past decade. Keen has also been able to demonstrate[41] that directing a stimulus to consumers, as was done successfully in Australia, more effectively counters a recession than directing it to banks, as was done in the US with only marginal effect.

Thus the recognition of economies as self-organising complex systems not only requires a shift in our understanding of the overarching nature of an economy. It is also beginning to transform our understanding of some of the detailed interactions that occur within an economy. We can recognise we are dealing with wild horses, and we are beginning to learn important things about how they behave, so we can begin to guide them.

5. *Calculating Reptiles*

In 1987 Margaret Thatcher said during an interview

> "... they are casting their problems on society and who is society? There is no such thing! There are individual men and women and there are families and no government can do anything except through people ... But it went too far. If children have a problem, it is society that is at fault. There is no such thing as society. There is a living tapestry of men and women and people and the beauty of that tapestry and the quality of our lives will depend upon how much each of us is prepared to take responsibility for ourselves and each of us prepared to turn round and help by our own efforts those who are unfortunate.[42]

This was the origin of an infamous quotation: "There is no such thing as society". In the context of the interview it is clear Mrs. Thatcher is arguing that we should rely less on government supports and take more responsibility for our own lives. Most people would not disagree about the need for a balance, though there is a wide range of views as to where the appropriate balance is. So perhaps Mrs. Thatcher was just making the usual conservative argument that the balance was too far on the side of government supports and needed to be shifted back towards individual responsibility. We might also think she was urging us not to treat "society" just as an abstraction but to remember that it consists of real people. And yet she used such a bald expression, not once but twice: "There is no such thing." Judged by her actions and by her sources of inspiration it seems Mrs. Thatcher may well have meant her assertion to be taken literally.

Modern economics manifests economists' fundamentally conflicted attitudes towards social interactions and the society that results from them. On the one hand, our social behaviours are crucial to large sectors of the economy, notably advertising and fashion, and feature importantly in the more enlightened forms of management theory and practice. On the other hand social interactions are excluded from consideration in the neoclassical theory of free markets. One of the most influential progenitors of the modern ideological order, Friedrich Hayek, went so far as to regard our social responses as primitive hangovers from our past that we should quickly evolve beyond. The latter attitude conflicts with the teachings of Christ, with the morals and ethics espoused by most religions and with most people's sense of decency and morality.

The neglect of society has older origins than Hayek. As we saw in Chapter 3, the neoclassical theory was built assuming that the people in the idealised economy were extremely simple beings, otherwise the mathematics is too hard. Co-founder Leon Walras assumed people are rational, and in particular that they are materialists who want the greatest value for their money. He assumed they are cold and efficient calculators who can and will decide among the many ways they could spend their money by calculating the combination of goods that maximises the value they can obtain. He assumed that their choices would not be influenced by what anyone else was buying, except as other people's decisions affected the market price. These creatures that populate Walras' abstract world have been called *rational economic man*, or *homo economicus.* Nobody seems to have thought to call any of them *economic woman*.

As a scientist, I recognise that Walras was simplifying the problem to the point where it would be mathematically tractable. Scientists do this all the time, as a way to get a foothold on a problem. The key, however, is to remember that the simplifications you have made might have a large effect on the results of your calculations. The art is to find those simplifications or *first approximations* that preserve some essence of the behaviour of what you are trying to understand. If you simplify injudiciously you may throw the baby out with the bathwater. We have already seen this in previous chapters: if you change any one of several assumptions of the neoclassical theory you predict economic behaviour that is radically different from the general equilibrium that Walras came up with, although it better resembles the behaviour of real economies.

So it is with social interactions: excluding them excludes important features of our economy. If there are no social interactions, there can be no fashion industry. *Homo economicus* would rationally calculate what clothing would best serve his practical needs for covering and warmth and would find the best price for those items. That might approximate how a mountaineer buys his mountaineering clothes, but there are not too many women who shop that way. "Fashion" is commonly understood to refer to fashions in clothing, and that is a prominent and large segment of our economy, but fashion is not confined to the rag trade. Fashion plays a very prominent role in the car industry and a significant role in housing and household goods, and those are very large segments of our economies.

However the consequences of ignoring social interactions in economic theory run more broadly and deeply through our society even than failing to account for a big chunk of economic activity. When Margaret Thatcher said there is no such thing as society she was echoing the considered conclusion of one of her heroes, Friedrich Hayek. Thatcher's other hero was Milton Friedman, who was also a disciple of Hayek. Hayek's ideas fed powerfully into what became neoliberalism. This was no accident, because in 1947 he founded a forum for like-minded people called the Mount Pelerin Society (see McKnight[43] p. 51). Over the next couple of decades ideas promoted by the Mount Pelerin Society gained ground among academic and professional economists and helped to lay the foundation for the neoliberal dominance of the past several decades.

The context of Hayek's thinking was the contest between socialism (including communism) and capitalism. He adopted the neoclassical conclusion that free markets yield the best possible result, and he added to it the insight that markets are capable of processing vast amounts of information. This happens partly through the "price signals" that transactions send through a market, but even more so through the much larger amount of information to which participants refer before engaging in a transaction. The transaction distills each participant's assessment of what they prefer, what else is available, whether the purchased item will fulfill its intended purpose, what was the cost of production of the item, what margin of profit will provide for the seller's expenses and livelihood, and so on. The assessment of this information does not have to imply a massive rational calculation, regardless of how Hayek might have envisaged it. Rather we only have to acknowledge that people do routinely assess a great deal of information in the course of their daily lives by whatever means they might employ, intuitive, rational or by learned empirical rules. Such information processing, Hayek argued, is why the centrally planned economies of communism failed, because no bureaucracy could possibly process such a vast amount of information and reach sensible choices. With the benefit of hindsight, and with modern knowledge of self-organising systems that develop emergent behaviour from relatively simple interactions of components, we can only agree.

Having made a valid point about a strength of markets, Hayek did not just conclude that markets therefore have a very useful role to play in our societies. He had a much grander vision. Hayek proceeded to conclude that markets, and markets alone, should be the arbiters of all our interactions with each other.

Hayek's central concern was personal liberty (McKnight[43] p. 63-74). His conception of liberty was of a narrow and severe kind. He distinguished it, for example, from that of "social liberals", who thought society or the state should cultivate conditions in which we can develop our individual potential to the maximum, for example by providing education and health services and ensuring access to an adequate livelihood. Hayek's version of liberty was the liberty to be left alone, and to be free to pursue one's inclinations so long as one does not intrude on another's liberty. This sounds like libertarianism, but it goes further. The real distinctiveness of his ideas arises from his vision of how to implement such liberty. His perception was that human cultures are so diverse there is little one can find in common among them, with one exception, and that is the desire to acquire material goods. (This perception will be challenged below.) He perceived that societies with well-developed market systems had increased their material prosperity and their population, which he took as prime measures of success. He considered that becoming an agent in a market system was therefore an evolutionarily successful strategy, and that the future of humanity is to evolve beyond old social behaviours and into what he called the *sponaneous market order*. Put simply, our interactions with each other would reduce to material transactions in an unfettered market, and the market would spontaneously and efficiently bring about material prosperity without intruding on our liberty. Beyond the bounds of the family there would only be the market. There would be no such thing as society.

Hayek's view of morality was entirely conditioned by this vision. Behaviours that promote the functioning of the market, like honesty in exchange and contract, respect for

private property, trade, competition, gain and privacy are moral. Feelings of altruism and obligation are unnecessary, and in fact tend to interfere in the market, so they are immoral. "An order in which everyone treated his neighbour as himself would be one where comparatively few could be fruitful and multiply" (Hayek[44] p.13). Hayek allowed altruism only in one context, that of the nuclear family, acknowledging that to impose the discipline of the market on the family would be to crush it. (This has not deterred some neoliberal theorists from intruding rational choice theory, derived from the neoclassical theory, into social contexts including the nature of the marriage relationship.)

Here we may suspect we are close to an important source of conspicuous modern phenomena. The increase in selfishness, the weakening of the social fabric, the stresses placed on relationships and families, the materialism and greed, the disposal of public assets, the attacks on public institutions, the ever-expanding material economy and consequent destruction of the natural environment, these, one might suspect, would be plausible consequences of attempts to impose Hayek's vision.

There are various ways one might describe Hayek and his vision. Utopian and extremist come to mind. His vision of the perfectability of human beings into selfish individuals acting in the absence of society resembles nothing so much as the communist vision of the perfectability of human beings into selfless members of a mass society. One vision reduces human behaviour to pure competition and the other reduces it to pure cooperation, but they are equally utopian and absolutist. Neoliberals often accuse their perceived opponents of social engineering, but this is social engineering of the grandest and most brutal kind.

The evolutionary thread in Hayek's thinking is notable. It is a raw form of social Darwinism, the survival of the fittest in a purely competitive world, with fitness judged by greater numbers of progeny, and thus by an increasing population of the group. Incidentally there is no basis for any implication that Charles Darwin would have approved of social Darwinism, as he was a moral man who was sorely troubled by the apparent inconsistency of his theory with the Biblical account of creation. Also the modern conception of natural selection is more sophisticated than the old image of "nature red in tooth and claw", because it allows for cooperative alliances and attachments having survival benefit, as we have seen in Chapter 4.

Another description of Hayek and his vision might be sociopathic. Truly, this man had little appreciation of the value of social intercourse. Of course the economics profession seems to attract a disproportionate number of left-brain, linear-rational types. This is presumably why in 2001 the Parisian economics students, tired of their professors' endless parade of sophisticated mathematical theory and pining for a more historically- and socially-based account of economies, called for the creation of *post-autistic economics*. Autistic is indeed not a bad description of Hayek and neoliberalism: impaired perception of social cues, disinterest in social interaction, restricted and obsessive behaviour.

Putting it in a larger perspective, all mammals are social. You have to go back to the reptiles to find an absence of social behaviour that compares to Hayek's vision of our future. And by reptiles I don't mean dinosaurs, for which there is evidence of herding and

family care behaviours. Reptiles are the ancestors of both dinosaurs and mammals, so I'm talking about snakes, lizards and turtles.

Hayek's morality is a complete inversion of traditional moralities. Central to most people's perception of morality is consideration for others, as in the golden rule: do unto others as you would have them do unto you. This principle is a common thread throughout the world's cultures and religions, in contradiction to Hayek's claim that the only common thread is material acquisitiveness. Hayek derides the golden rule simply on the ground that it (allegedly) interferes with the maximisation of material gain and thus competitive and evolutionary advantage.

Finally, Hayek swallowed whole the neoclassical claim that free markets will automatically yield the optimal material outcome. We should appreciate the potential for absolutism in the neoclassical claim. It is not a claim that free markets order our material affairs with reasonable efficiency. It is a claim that free markets are the most efficient of all possible ways we might organise our material affairs. The result is the uniquely best conceivable outcome. If the mathematical elegance of the theory has a seductive appeal to economic theorists, the claim to the best possible outcome has a seductive appeal to political theorists. One can then argue that this is the best way to eliminate poverty, since free markets will allow us to generate wealth as efficiently as possible. One can continue, and argue that anything or anyone that interferes with the free operation of markets reduces the general welfare and increases poverty. Such interference is therefore undesirable, even evil. If one confuses a mathematical result with a universal truth then one is at risk of contracting zealotry. Many have been thus infected, but few have had as full-blown a case as Hayek.

Many people will find Hayek's vision of (non-) society, human nature, human destiny and morality repugnant, and little more will need to be said. For them love, close family relationships and a functioning community of some kind are central to a fulfilling life, and compassion is central to a moral life.

However the attitudes articulated by Hayek have penetrated deeply into our institutions and culture, though usually in slightly less extreme form, and thereby have become familiar features of our societies' rhetoric and mental landscape. Also Hayek's vision might have been extreme, but many of the ideas he drew on already had long histories. We may not agree with these ideas but we have to varying degrees accommodated to them, and it is no longer straightforward to reject or discredit them. It will therefore be necessary to challenge them in as many ways as we can, so as to reclaim our mental and moral landscapes for healthier ideas and precepts.

We can look at Hayek's ideas at the levels of spirituality, biology and anthropology, experimental psychology, living systems, modern management practices, and some obvious manifestations of social behaviour in our economies. Not everyone will relate to all of these, but their very range and diversity means that most people will relate to some. We may thus, each for our own reasons, agree that love, relationship, community and compassion are essential to what it means to be human.

All forms of spirituality recognise the centrality of connection. Even the most reclusive monk is seeking connection with God, and through God and love connection with all people. The mystical experience is reported as the intense awareness of connection: connection with a lover, with all people, all beings, or with the universe and all reality. The awareness is not an idea or an abstraction, but an immediately felt experience, and the accompanying feelings are described in terms of love and compassion for others. Religions emphasise love, and emphasise the active manifestation of love through service to others, in other words through compassion and altruism.

From the perspective of biology, social behaviour is a distinctive and pervasive trait of mammals. The vast majority of mammals live in social groupings, and have an array of behaviours that facilitate and reinforce the persistence of the group as an entity. There are many kinds and styles of social behaviour, but there is always recognisably social behaviour. We humans are mammals, and we and our close relatives are not exceptions. We have our own particular kind of social structure, and a behavioural repertoire that goes with it, as a few exampls will illustrate. Our mating takes place in the context of pair bonding of fairly long duration, which we recognise and sanctify through the institution of marriage, virtually universally through human cultures. We are attuned to live in small groups and small communities. Our ancestors lived in villages or tribes or hunter-gatherer bands. We can be loving and we can be quarrelsome, but through it all we have a strong urge to be accepted by a group. To be an outcast on the African savannah would have meant having a very short life expectancy. We have a strong tendency to form into small social hierarchies, acknowledging a leader and being willing to take direction, within limits. We have a well-developed sense of fairness and react strongly to anyone perceived to be freeloading or otherwise cheating.

You might regard some of the assertions I have just made as debatable, but recent experiments with people have clearly demonstrated some of these behavioural tendencies. “Experiments” may have conjured up images of people hooked up with wires and penetrated by nasty-looking probes, but experimental psychologists are generally a pretty benign lot. Their experiments typically consist of setting up a situation and observing how people respond. In fact one of the most instructive experiments involved giving people money. Since the most available subjects for experiments are often the students on an investigator’s campus, and students are typically poor, the money was reasonably well placed, although the students may have been given a slightly misleading impression of how the real world works.

One experiment that has been repeated many times in different contexts and cultures is to take people in pairs and to offer one of them some money on condition they share some of it with the other person. If they don’t offer to share or if the other person refuses their offer then neither gets any money (as recounted by Beinhocker[39] p. 121-3; see also Gintis et al.[45]). For example one person might be offered $20 on condition that some is shared with the other person. The “rational” behaviour is for the person given the money to offer only a very small share to the other person, say $1, and for the other person to accept anything that is offered. That way they would both be better off. However people very consistently reject offers of very small shares, and they do so with indignation, considering the offerer to be selfish and the offer to be unfair. They would rather go

without anything than go along with such selfish behaviour. Offers to share anything less than about 30% of the money tend to be considered unfair, though the threshold of perceived fairness does vary among cultures.

This behaviour makes good sense in the context of small communities, including hunter-gatherer groups struggling to survive. If everyone cooperates and shares then more food is likely to be gained, and if anyone doesn't succeed in gathering food for a day or two they can survive with the help of the others until they have more success. This is also the logic behind the pervasiveness of social groups among mammals. Hunting is much more productive if hunters form cooperative groups, as lions and wolves demonstrate, as well as humans. Obviously the group strategy only works if everyone pulls their weight and if everyone is willing to share. If selfishness becomes too common within the group then others are likely to stop cooperating and the group will fall apart. Everyone's survival would then be at greater risk. We have a strong inclination to cooperate, so long as those we deal with are mostly cooperating: we are *conditional cooperators*. The sharing experiment, and other experiments along similar lines, show that we have a strong tendency to punish selfishness even when it makes us worse off in the short term. This has been called *altruistic punishing*, because we are willing to sacrifice some of our own wellbeing to improve the prospects of the group (and, indirectly, our own prospects).

Some sceptics have doubted whether these behavioural tendencies are innate. Perhaps the participants in the experiments were merely adopting a sophisticated strategy in the expectation they might deal with the same person again in the future. In any future encounter the offerer would know they had to make a reasonable offer or the deal would fall through. To check this some experiments were conducted in which great care was taken to ensure the participants knew there was no possibility they would deal with the same person again. The results were the same. The behavioural tendency is innate. From an evolutionary perspective this is no surprise, as we are the product of two million years of human development and over one hundred million years of mammalian development.

I have been careful to say "behavioural tendencies" rather than "behaviours", and to describe our behaviour as "conditional cooperation". The amount of cooperation in a group can be higher or lower depending on the culture of the group. Human behaviour is fairly flexible and subject to cultural modulation. There are some cultures that are relatively cooperative and other cultures in which cooperation is lower, and the level of cooperation can change with time. Cooperation may break down in a period of disorder, and it can be difficult for a society to re-establish a cooperative culture. This would have obvious implications for the functioning of the society's economy.

Close attention to the world around us shows that cooperation is much more deeply entwined in living systems than just the social groupings of humans and mammals, as we have already noted. Cooperative arrangements can be as loose as a school of fish or a herd of wildebeest or as tight as the ancient symbiosis that gave rise to the cells in your body. Single-celled organisms are divided into two large groups: the bacteria or prokaryotes, which have no nucleus, and the eukaryotes or nucleated cells, which have not only a nucleus but other structures called organelles within them. It has been determined that

the eukaryotes are compound cells formed by symbioses between formerly free-living bacteria[46]. For example, one of the organelles, the mitochondrion, which provides energy by burning oxygen, has its own DNA and its ancestors were once free-living bacteria. The parent cell provides nutrients while the mitochondrion provides energy. Evidently this alliance has been a spectacular success, because all multicellular organisms, which means all the plants, animals and fungi you can see with the naked eye, are composed of eukaryotes. Your own body is another spectacular example of cooperative behaviour: trillions of cells are intricately choreographed into the almost inconceivable complexity of your organs, nervous system, blood stream and so on. Ant nests and beehives are elaborate, though less intimate cooperative groups.

Thus our mammalian-type social grouping can be seen to be but one example in a very broad spectrum of cooperative arrangements going from individual bacterial cells on the one hand up through family groupings, extended families, troops, tribes, hives and multicellular organisms.

I have been emphasising the role of cooperation in life, but only to contest the view that life can be reduced to pure competition. We can also be selfish and competitive. In fact a degree of self-concern and self-care is also required for a healthy physical, emotional and spiritual life. If we subordinate our own needs completely to the needs of others our energy will dwindle and we will eventually burn out. We can engage best in the give and take of life if we attend to our own basic needs to keep ourselves healthy and vigorous. It is also healthy to be competitive to the degree that we assert our own basic needs and develop our own unique expression of life. If we merely serve or copy others the world is deprived of the unique contribution that we could have made.

It is curious that in Western culture we tend to emphasise one extreme or the other. On the one hand we have, especially since the scientific and industrial revolutions, praised the virtue of competition and individual liberty. On the other hand the Christian churches include a strong tradition of self-sacrifice, in service to others or in service to God. With a very different flavour, communism, the extreme form of socialism, advocates complete self-sacrifice to the good of society. The history of the twentieth century is to a large extent a contest between those advocating a system based on pure competition and those advocating a system based on pure cooperation. The twentieth century is also notable as a period of great conflict and destruction, and for having brought humanity perilously close to annihilation through nuclear war.

This brings us again to the Taoist insight that a healthy life is one that balances opposing polarities. Rather than seeing cooperation and competition as irreconcilable opposites that we must choose between, the lesson from Taoism, and from the living world, is that the tension between competition and cooperation is healthy. The tension may not always be comfortable, and it certainly does not allow life to be reduced to simplicities or absolutes, but it is necessary to our vigor and survival.

Having surveyed the evidence for the view that human beings are social beings who manifest both selfish and cooperative behaviour in potent combination, let us look at manifestations of social behaviour in our economies. Again the point here is not to argue for social behaviour over individuality, but merely to contest the neoclassical and neoliberal claims that social behaviour can or should be ignored or decried.

The fashion industry exists because we like to display. It is part of our social behavioural repertoire. Women's fashion tends to be the more varied and colourful and is more about sexuality, whereas men's fashion is more uniform and about power as well as sexuality, but both play a large part in our social interactions. A glance at a magazine rack will illustrate how large are the social and economic roles of fashion.

The marketing industry exists in its modern form because we have social responses and because we are, in the neoclassical conception, irrational. Marketing includes advertising but it is bigger than advertising. Marketing includes searching out the locations or characteristics of potential customers, but it is also marketing that leads to the creation of enclosed environments that are carefully managed to make us more susceptible to the subtle suggestions and persuasions of advertising. I'm referring to shopping malls.

The triple obsessions of advertising are sexuality, emotional insecurities and status. Human sexuality involves highly social responses that advertising triggers with ridiculous and monotonous ease. Our emotional insecurities are about the fear of not being socially accepted. A solitary species like a praying mantis must care nothing about what other praying mantises think of it, it is only concerned about its next meal and about reproduction. In fact its next meal might be the male mantis it just mated with. We humans do care, very much, whether we are socially acceptable, because we carry deep within us the echo of the African savannah, where to be outcast was to die. There is also an echo from our own infancy and young childhood, where again to be rejected or neglected by our parents was to be at risk of dying. Much advertising aims to trigger our fear of rejection in association with a suggestion, subtle or blatant, that if only we buy product X we will be accepted by everyone. Appeals to our wish for status are blatantly obvious in the plethora of advertisements for gleaming luxury vehicles, status symbols *par excellence*. Praying mantises and *homo economicus* care not one whit for status. Status exists only where social hierarchies exist, which of course requires a social species.

A small part of marketing is socially innocuous and contributes to economic efficiency, such as identifying potential customers. However most marketing is less savoury and actively alters the dynamics and purposes of our economies and societies. In fact marketing has come to play a central role in consumer capitalism, the dominant modern form of market economy. Consumer capitalism is about persuading us to buy more stuff: more than we need, more than is good for our physical, emotional and spiritual health, and more than the planet can support. Our economies have become pathological, the nerve center of the pathology is marketing, and marketing works on our social behaviours.

Thus a conception of economics that ignores social behaviour not only overlooks large segments of modern economies, it is blind to the dominant pathology that threatens imminently to bring about the destruction of the global economic system.

There is a lot more still to be said about social behaviour and its role in economies. A healthy society is essential to a healthy economy, and healthy social relationships are essential to a healthy business.

Conventional attempts to bring prosperity to so-called under-developed countries tend to focus on corporate investment and on loans for big infrastructure projects such as dams. Evidently these efforts have been broadly unsuccessful, judging by the information we looked at in Chapter 2. There is a large literature documenting the failures in more detail[15,47,48]. When these efforts go awry, as they often do, the World Bank tends to blame the locals, and the common complaint is corruption. There may be considerable truth in the claim, but perhaps it is not so surprising, and perhaps we should look a little further afield before allocating ultimate responsibility. For example, Papua New Guinea (PNG) in its recent past was a village-level agrarian culture with multiple tribal rivalries, complex social and tribal relationships and traditions and few nation-level common traditions. If outsiders suddenly start throwing almost unimaginable amounts of wealth into this ancient and volatile mix what would one expect? The political leadership is inevitably distilled out of the local power groups and rivalries, and the new "development" money inevitably fuels those rivalries as much or more than the interests of the externally-imposed concept of a nation. I mean no disparagement of the rich cultures of PNG, I am simply remarking on how different their traditions are from that of a modern nation state.

One can't expect large-scale projects to be sensibly undertaken by a society until appropriately large-scale cultural institutions have been developed. Conventional economists acknowledge this to some degree when they assert that a country needs to develop a good banking system and a respect for private property and the rule of law, but they often manage to imply it's straightforward to set such institutions up and the people must be backward if they haven't managed to do that. Historical knowledge and cultural sensitivity are not necessarily very well developed among economic technocrats. In any case, if it's understood these institutions are necessary why is there not more effort to promote them before huge amounts of money are thrown into local cultural milieux?

You may think I'm being a bit unfair to economists in accusing them of naïvety and ignorance. As individuals the great majority are no doubt well-intentioned and many will be relatively well-informed, yet the results of their collective efforts often invite castigation. There are those, however, who are not so pure. John Perkins[49] gives a disturbing account of his earlier career as an "economic hit man". He admits to having been naïve and confused. His job, basically, was to identify receptive members of the elites of under-developed nations and to pitch exaggerated, even fanciful, economic analyses to them that purported to justify taking on large loans to develop infrastructure. Often the rather transparent motivation of the local elites was to siphon some of the funds into their own pockets. The motivation of Perkins' masters, he eventually came to understand, was twofold: to create profit opportunities for large American firms and to enmesh poorer nations in debt, so they would be more malleable. This was an extension of the more malevolent side of United States foreign policy. Behind the economic hit men, Perkins explains, were practitioners of other, less subtle methods of disruption and persuasion, and behind them, if necessary, were assassins. Unfortunately some of the least pure are found among the most powerful.

There is a dawning after-the-fact appreciation that one must consider more than just money and some basic physical infrastructure in endeavouring to improve material prosperity. A recent study has shown that the most important factors are not natural resources and technologies, nor even necessarily the competence of governments. The most important factors are social: respect for the rule of law, recognition of property rights, economic transparency so people know where the money is flowing, a well-organised banking system, a lack of corruption and other such factors are far more important than any other category of factors[50].

Eric Beinhocker uses the term *social technologies* to describe the myriad ways in which we organise ourselves in a modern society.[39] Our legal and banking systems did not just spring into being, they are the result of centuries of trial and refinement. We have had to discover or create specialised kinds of organisation just as much as we have had to discover or create specialised ways of arranging physical matter into new *physical technologies*. As social technologies become established in a society they become the normal way of doing things, and thus they become part of the local culture. Social technologies must co-evolve with physical technologies, infrastructure and finance in order for development to progress. It is even true that a country with a well-established enabling culture can remain prosperous even with incompetent governments and few resources, whereas no country that lacks an enabling culture is prosperous.

Philosopher Karl Popper[51] sees social interactions and institutions in even more fundamental terms. In Popper's view our very awareness and human identity have co-evolved with a collection of transmitted cultural concepts that he calls World 3. His World 1 is the material world accessed by our senses and World 2 is our internal subjective experience. World 3, he says is a human creation but it exists independently of individuals. It includes our myths, world views, artistic traditions, mathematics, scientific knowledge and a vast array of practical knowledge of the material world and of how to organise ourselves in various ways. In other words World 3 comprises our total culture. Popper's insight is that our core culture has co-evolved with us, and that our self-awareness at deep levels is dependent on it. In this view one cannot possibly expect a recently near-stone-age agrarian culture like that in Papua New Guinea, however rich and durable it was, to quickly create the social institutions of a modern industrial economy.

A key quality of an enabling culture is trust. Some societies have cultures that feature high levels of trust, whereas others have low trust. Not all societies with high trust are wealthy, but no society with low trust is wealthy[52]. For example, Norway and Japan are high-trust countries that are wealthy, but China is a relatively high-trust country that until recently has been quite poor. On the other hand Brazil is a very low-trust society and is quite poor.

Large differences in trust may exist in a single country. In northern Italy trust is relatively high, and the region is quite prosperous. However in southern Italy trust has historically been very low and the region is notoriously poor[53]. We can understand the difference in terms of our tendency to be conditional cooperators: if those around us are cooperative then we are too; if they are not, we are not. In societies with low levels of trust it is hard to build networks of trusting relationships. People tend to fall back on

family connections and informal alliances, including organised crime networks, which have traditionally been family-based. If trust is limited to such relatively small networks with only poor connections between them then it is difficult to build the society-wide organisation that facilitates commerce, such as a reliable banking system and an honest public service.

An enabling culture must also exist within a firm if the firm is to prosper. A large modern firm is a complex, multi-layered, multi-faceted organisation. Its functioning must ensure that people cooperate in a coherent way, that people and resources are appropriately allocated to tasks, that tasks are aligned with the current business plan, and that the business plan is likely to ensure the firm's survival. The firm's business plan is likely to be a nested structure of sub-plans. The organisational structure needs then to be a nested structure, typically of hierarchies, that match the business plan structure. The business plan should strike a balance between exploiting current market advantages, which will not last forever, and betting on future market opportunities. The organisational structure should strike a corresponding balance between discipline and focus in exploiting the current market position on the one hand and, on the other hand, freedom to explore and make mistakes in searching for future opportunities. Through all of this must permeate a culture in which people feel appreciated, motivated, willing to speak up, willing to be corrected, willing to learn and willing to take appropriate risks. Few firms will have all of these attributes well developed, but no firm that survives can be without some of them. Social structures and social interactions are integral to the mix of attributes that successful firms must have.

Beinhocker[39] (p. 349) cites the well-studied cases of General Electric and Westinghouse. Both firms rose to prominence late in the nineteenth century and both survived as large prosperous firms until the 1970s. At that time both firms experienced difficulties. Westinghouse struggled through a series of crises and attempted transformations, but it steadily declined and by the end of the century it was no more. In contrast, GE managed to recreate itself, as it had several times in its long history, and went on to prosper through the 1990s. Both independent observers and the CEO of the time, Jack Welch, attribute GE's survival to what Welch calls its social architecture, which comprises the behaviours of individuals, its structures and processes, and its culture. Westinghouse is said to have lacked essential features of such a culture.

This business reality is in stark contrast to neoclassical economic theories and neoliberal ideology. In the neoliberal conception employees are mere components, to be used or discarded as the market dictates. No loyalty is offered to employees and little is received in turn. In the 1980s the fashion was downsizing, in which the number of employees was reduced but the amount of work changed little. In the 1990s the fashion became outsourcing, in which employees were fired and their services often re-hired as consultants. Employment was replaced to a substantial degree by short-term contracts. By these means the interactions between the firm and many of its functionaries came to be mediated more by market mechanisms than by human relationships, in accordance with the ideology. Such arrangements had the additional advantage that risk was also

outsourced: if business slumped contracts and consultants could be terminated with little fuss.

Advocates of these neoliberal fashions are blind to the heavy price paid in other ways. People function best when they feel appreciated and valued, because then they feel secure in the group and therefore safe (remember the African savannah). If they are liable to be discarded with little notice, employees feel unappreciated, will give little loyalty to the firm and have little motivation to offer it their creativity. There will also be little trust and minimal cooperation among employees, since they will all be competing for favour. Turnover of employees will be frequent, leading to a heavy loss of corporate memory, a notorious feature of many modern government organisations as well as large corporations. The poor performance of economies in the neoliberal era (Chapter 2) is an unsurprising consequence.

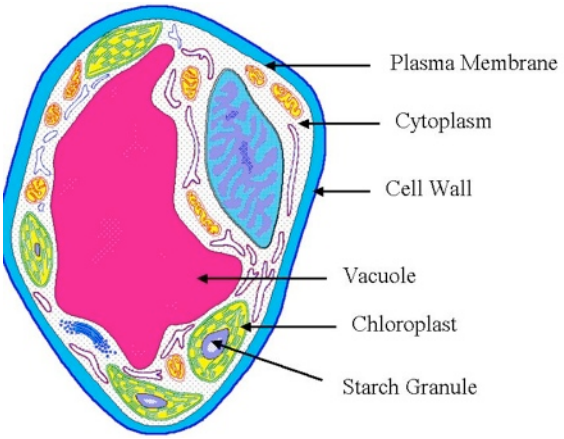
Human beings are social beings. Our religions, our traditional cultures, modern biology and modern psychology all agree on that. For most people the importance of family, friends and community are not a matter for debate. Nevertheless a thoroughly alien idea has taken root in our modern culture, the idea that we can and should function purely competitively, with the focus of the competition being material things.

The damage wrought by this pathological conception is all around us. Our social fabric is threadbare and torn. Many people feel isolated and unappreciated. They feel an emptiness and lack of purpose to their lives. They feel stressed, and never seem to have enough time for family life and community life. We are offered the opiate of materialism, but it never satisfies. The persistence of our misplaced cravings is destroying the natural environment upon which we depend. We need to purge the alien conception from our culture. We are not calculating reptiles. We must restore the essence of our humanity, our social and spiritual nature, to the centre of our conception of ourselves and our societies, and we must act on that conception.

6. *Healthy Boundaries*

But we will decide who comes to this country, and the circumstances in which they come.

- John Howard, former Prime Minister of Australia, election policy speech, 28 October 2001.



In August 2001 Australian Prime Minister John Howard gained world-wide notoriety by blocking the entry of legal asylum seekers into Australian territory, and thus contravening Australia's international agreements. The asylum seekers had been rescued at sea by the Norwegian vessel *Tampa*. Howard subsequently condemned thousands of them to years of internment in isolated and desolate prison camps within Australia and in island nations near Australia. The vast majority of these refugees were eventually found to qualify for asylum within Australia.

The refugee numbers (a few thousand per year) were very small compared with Australia's other immigrants, legal and illegal. Many more illegal entries are made simply by overstaying visitors' visas, and most of those illegals are European and evidently of little concern. Most tellingly, the number of asylum seekers was very small compared to Australia's total immigrant intake, which has been at least 70,000 per year for many years and was dramatically increased to around 300,000 per year by the subsequent Labor Government. Australia shares no land border with any other nation and the number of refugees is correspondingly small, compared with refugee influxes into many other countries, including the United States and much of Europe. Thus Howard's was a particularly harsh implementation of so-called border protection.

On the other hand Mr. Howard had few concerns about Australia's borders being porous to inflows of goods and outflows of money and jobs, nor was he concerned about control over Australia's economic affairs passing to foreigners. His government was an enthusiastic supporter of the neoliberal agenda of free trade and free investment. After multilateral free-trade talks stalled in 2003 he signed Australia up to a 2004 bilateral free-trade agreement with the United States that even many mainstream economists had little enthusiasm for, and whose alleged benefits have been difficult to identify. One of the arguments used to justify the agreement to the public was that Australia could export fresh cut flowers to the US. A more frivolous and inappropriate use of trade it would be hard to find. Many critics feared the deal would further diminish Australia's sovereignty

over its affairs. Even so, most of the commentary overlooked more fundamental deficiencies in the neoliberal push for free trade.

Trade is not just about goods and money, it impinges on many aspects of a nation's affairs. Foreign investment is even more fraught, and must be carefully handled if the host nation is to avoid becoming effectively a colony, both economically and in mentality. Trade and investment are thus beset with complications.

In neoliberal rhetoric, free trade automatically ensures mutual benefit to the nations involved, and trade can be considered separately from other aspects of national interest and international relations. Foreign investment is usually considered in conjunction with trade, and the neoliberal rhetoric is similar: restrictions on foreign investment should be removed.

In neoliberal practice, on the other hand, trade is free only in name. In practice there are restrictions, generally favouring the wealthy and powerful, whether individuals or nations. The Australia-US agreement would be more accurately described as a preferential trade and investment agreement rather than a free trade agreement. Australian access to the US market is significantly limited, notably for the Australian sugar industry, whose existence is threatened. This turns out to benefit one of the largest grain processing firms in the world, the US-based Archer Daniels Midland, which relies on protective tariffs to make its high-fructose corn syrup profitable, to the detriment of the finances and health of US customers[54]. However the agreement gives generous access for US investment in and technological sales to Australia. Foreign investment restrictions were weakened in the face of strenuous political objections from citizens and local interests, who rightly saw their autonomy being threatened.

The most basic problem with free trade is the same problem we have seen for free markets more generally: there is no basis in theory or practice for believing that free trade will automatically yield mutual benefit to the nations involved. The theory that supposedly justifies free trade clearly does not apply in the modern world.

Trade and foreign investment, seen without the blinkers and distortions of neoliberalism, are intimately connected with a range of important concerns including national security, sovereignty, social cohesion, culture and national character. Trade and foreign investment need to be freed from the naïvety and hypocrisy of neoliberalism, and instead managed with great care. Any organic entity must carefully manage its interactions with the world if it is to survive and thrive. It must prevent its life blood from leaking out, and it must prevent toxins from entering.

Trade between nations has always been a complicated business with a heavy overlay of national and international political manoeuvering. The mercantilist influence on government and the resulting trade monopolies are clear examples, and were the target of Adam Smith's ire. As a result trade has often been a vehicle of national rivalries. Wars over access to trade routes, resources or markets have been long-standing feature of history. "Free" trade, meaning trade free of such power-political influence, has therefore been proposed as a safety valve for international relations as well as a potential source of

mutual benefit for the trading partners. In 1913 they were also saying that trade and economic integration made another European war impossible[54].

A prominent argument for free trade was given in 1817 by David Ricardo, who proposed what has become known as the theory of comparative advantage. Ricardo's argument was presented through the example of wine and cloth production in England and Portugal. However his argument was not simply that Portugal produced wine more efficiently than England, and England produced cloth more efficiently than Portugal, because the latter proposition was not true. In fact Portugal could produce both wine and cloth more efficiently than England. Nevertheless Ricardo argued that trade could still be of mutual benefit. He argued that, of the English industries, cloth production was more efficient than wine production. Conversely, in Portugal wine production was more efficient than cloth production. Given both of those conditions, it would be to their mutual advantage if England concentrated on cloth production, Portugal concentrated on wine production, and they traded English cloth for Portuguese wine. In that way, each country would make more efficient use of its resources. The comparison implicit in the term "comparative advantage" is thus between industries within each country, rather than between countries.

Ricardo's arguments made reasonable sense within his time and context. However, as always, the argument depends on some important conditions, notably that employment is plentiful in both countries, that the trade is balanced and that capital does not move across borders. The latter condition, at least, was reasonably fulfilled in Ricardo's time, because investment overseas was difficult and risky.

Ricardo's theory is still one of the main justifications given for free trade, even though conditions are now radically different from what they were two hundred years ago. In the modern world of globalised finance, money flows across borders at rates of hundreds of billions of dollars per day, trade is often highly unbalanced, and there is significant unemployment (as there may have been in Ricardo's day as well).

The deregulation of international finance has radically changed the international trade regime. Both flows of goods and services and flows of investment money are very large. The effect of internationally mobile capital is no mystery: if capital is invested overseas, jobs follow. This has been amply demonstrated by the North American Free Trade Agreement (NAFTA). A free-trade zone was proclaimed in Mexico adjacent to the US border, factories were built and employee protections were minimal and little-enforced. Many kinds of production were moved from the United States to Mexico, so Americans lost jobs or their wages were reduced. Mexicans were overworked for pitifully small wages. Minorities in both countries increased their wealth and the common people of both countries were worse off, or little better off. This pattern has been replicated across the globe as industry and employment in rich countries have been "hollowed out" (to use the Japanese term) and moved to poor countries. The ease with which money flows across borders means Ricardo's argument has no relevance at all in the modern regime.

As well as Ricardo's assumptions (implicit or otherwise), modern attempts to justify free trade use the pervasive modern assumption that the economies of trading partners are in general equilibrium. The latter assumption is built into standard computer models of

economies. Reportedly, some computer models used to argue for NAFTA even included the assumption that wages are the same in the US and Mexico.[47]

Another big difference between Ricardo's time and now is the presence in the modern world of giant transnational corporations. Many of these have turnovers comparable to small nations. Being transnational, they are not under the control of any one national government, and they are in a position to play nations off against each other. They escape taxation and regulation by incorporating in a few tiny "tax haven" countries. A significant proportion of international transactions occur internally to these corporations and are difficult to monitor. Transnational corporations present a big challenge, because their interests are clearly different from national interests, they wield great power and they are difficult to monitor.

Implicit in Ricardo's argument is the assumption that employees who are displaced when local industries are replaced by imports will get jobs in more productive industries. This assumes that unemployment is insignificant, but unemployment has been a problem in developed nations since the early nineteen seventies. The free-traders' blithe acceptance of displaced employees overlooks the major disruption of employees' lives if they have to change occupations. It also overlooks the considerable burden of unemployment on society, directly through loss of production and unemployment payments and indirectly through resulting social problems. Evidently, with investment funds emigrating, alternative employment has often been inferior in the US and Australia, as the proportion of people in part-time and casual employment and in service industries has risen substantially.

According to Herman Daly and John Cobb[55], trade is presented in modern economics texts as though it were barter (e.g. cloth for wine) without the use of money as an exchange medium. This excludes the possibility of a trade deficit or surplus. However trade imbalances are a dominant feature of the present regime, and they distort the values of currencies.

Trade is also often presented through the analogy of specialisation of individuals. For example, it is not worth the time of a highly trained lawyer to do her own filing, since she gets a greater net return from employing her own skill being a lawyer while employing someone else to do the filing. However this analogy is invalid since productive capacity cannot be transferred as freely between individuals as it can between nations. In other words, there is no possibility that the lawyer could work 24 hours a day and so leave her filing clerk unemployed. Such transfers of productive capacity *can* occur between nations when capital can cross national borders, so that one nation can be extremely busy while another languishes.

The subjects of trade and international investment need to be thoroughly re-examined. Most obviously, in the absence of a general argument that trade and foreign investment will necessarily be of mutual benefit, any such arrangements need to be examined in detail by each nation. China and Japan have generally been smarter about this than the Anglo-Saxon countries, in which the neoliberal ideology is deeply entrenched.

From the perspective of living systems there are some imperatives that must be observed in interactions with other entities. Ironically, these imperatives are observed by businesses, but they are not observed at the national level where economists are in charge. Every organism and every corporation carefully manages its interactions with the outside world for the sake of its survival. In the same way, nations and regions must ensure that their wealth, employment and resources are not drained away by others if they are to survive perennially. Every organism and every corporation also interacts strongly with the outside world, for to do otherwise would be to cut off the flow of nutrients and energy essential to its survival. Every living system, including societies and their economies, is part of a larger system upon which it depends, so it must be careful not to compromise the health of the larger system. Every living system, including economies, also has components, organs or organelles upon whose proper functioning it depends. Thus a healthy entity requires healthily balanced interactions with the outside world of which it is a part and consideration of the health of its own internal components.

Carefully managing borders and interactions does not mean becoming isolationist. Rather it means being sensible about how we trade and about money flows into and out of a society. Though trade and investment can't be cleanly separated, we will look at trade first.

The fundamental point of exchange, whether it is between individuals or between societies, is to make both parties better off. Trade is not, or need not be, a zero-sum activity, which would imply losers as well as winners. Rather, healthy trade is a win-win activity that increases the wealth of both parties, such as England and Portugal both functioning more efficiently through an appropriate exchange goods.

Trade is not just about economics. It also involves national security and sovereignty. National security is involved because trade brings with it dependence on the viability of trade routes, on fuel costs for international transport, and on the financial and political stability of trading partners and the global trade network. Sovereignty is involved because dependence on trade inevitably gives decisions made overseas some leverage domestically.

The significance of trade to national security is not entirely lost on those in control of the present regime, but unfortunately their goal is often to play power games rather than to seek mutual benefit. They are also usually coy about acknowledging national security factors, since neoliberal rhetoric is about free trade and political considerations are supposed, in the neoliberal vision, to be excluded to ensure maximum benefit. Sovereignty, on the other hand, seems to be of no concern at all, since the neoliberal vision of the world is of seven billion individualist reptilian consumers, and nation states just get in the way.

For different reasons, transnational corporations have a mixed relationship with nation states. Their interest is for national governments to service their needs for protection of private property and enforcement of contract, but otherwise they resent governments doing things that interfere with profit maximisation.

It is not a simple matter to decide which kinds of trade are healthy for the whole society involved, because there will be natural fluctuations in the level and balance of

trade, there are non-economic factors, and there will be conflicting interests between individuals and society. However the principles spelt out above, to carefully manage boundaries, to seek mutual benefit and to ensure the health of component parts, give general guidance. Some mechanisms have been proposed that would be extremely helpful in ensuring trade follows those principles at least approximately. At present there is also a serious lack of information, and a lack of the means or even the will to limit the most blatantly unhealthy behaviour. The paradoxical implication of this sorry situation is that it will not be very hard to improve our performance.

A basic requirement for trade to be *mutually* beneficial is that there be no large net transfer of wealth in either direction. The neoliberal doctrine stresses free trade only because the doctrine holds that trade will automatically come into balance. Real-world trade does not automatically come into balance, so policies aimed at ensuring a balance of trade are required.

Unbalanced trade means one country accumulates a surplus of money while another accumulates a surplus of debt. In the case of a trade surplus, it may seem that exchanging goods for money is a fair exchange, but we must remember that money is not itself wealth, it is only a token of wealth. So long as the money holds its value it can be exchanged for goods or services. However if a large trade deficit accumulates, as it has for many Western countries, especially the United States, then it may cause the national currency to depreciate against other currencies. For the country in deficit this makes its exports cheaper and imports more expensive, which helps to correct the imbalance. However the devaluation represents a loss of wealth for countries with a surplus of a trading partner's devaluing currency, such as China, since they can no longer purchase goods of value equivalent to those they sold. In the current unstable and volatile global regime, a large debt also carries the risk that a crisis could trigger a loss of confidence in the national economy followed by a catastrophic devaluation. There is a growing concern that the indebtedness of the United States could trigger a rush to dispose of the US dollar, which could dramatically devalue it, and destabilise the whole global system. Finally, fluctuations of currency values also hinder the efficiency of commerce, as will be explored in Chapter 7.

The design of policies that will efficiently yield a balance of trade is a challenge in the presence of multilateral trade conducted by many different kinds of economic agents, some within national boundaries and some straddling them. One useful idea suggested by Herman Daly and John Cobb[55] is for national governments to conduct periodic auctions of tradable import quotas. The total amount of the quotas would be set equal to the total of national exports, and the auction mechanism would apportion import rights among domestic firms. This idea of tradable import quotas is directly analagous to the mechanism of tradable pollution quotas used in the US successfully and efficiently to reduce sulphur dioxide emissions, and being advocated internationally to regulate carbon emissions, though the latter form has become currupted by the influence of special interests pressuring weak governments.

A variable import tax would offer an alternative approach to the same problem. This would differ from standard customs duties in being applied uniformly to all imports, in

addition to any duties already applying, and being adjustable in the way interest rates are currently adjusted. This approach might be administratively simpler than auctions of import quotas, and could be more quickly responsive to any developing trade imbalance, though it may be less attractive to politicians than a quota system.

Foreign investment is the other major mode of international interaction. In the neoliberal view foreign investment is regarded unconditionally as a good thing, because the financial markets are supposed to allocate finance to the most efficient available uses, and whether those uses are local or overseas is irrelevant. We have already seen that in reality the financial markets are largely concerned with speculation, and their allocation of investment funds is erratic and highly inefficient. Nevertheless large investors have been only too happy to take advantage of the deregulation of international finance, because production costs are much lower in poorer countries. Wages can be very much lower, and generally social, safety and environmental regulations are weak and poorly enforced. As a result a great deal of outsourcing and "offshoring" has occurred in recent decades as capital, plant and jobs have been moved from wealthy countries to poor countries. One result of weak regulation in poorer countries has been the apprearance in the US of Chinese toys contaminated with poisonous lead paint.

In the investment-exporting countries this has, in the short term, significantly reduced employment and wages in the wealthy countries from what they would have been. Even the threat of moving factories offshore puts strong downward pressure on wages. Neoliberal advocates assure us that we will be better off in the long run, but that doesn't fit the real-world experience documented in Chapter 2.

On the other hand there is no guarantee a country with a net inflow of investment money will end up better off. This is especially so for many poor countries that are struggling under large burdens of debt. The difficulty is that foreign investors have to be paid dividends or interest on their investments. Private investors typically want returns of fifteen percent or more. If the country does not have well-developed financial and legal systems the required returns will be even higher, to compensate for the greater risk to the investor's money. The requirement to yield returns of twenty percent or more can be very onerous. To achieve such returns typically wages will have to be very low. If the country has weak employee protection laws then wages can be barely at subsistence level. The result of such foreign investment can be large returns to the foreign investors and perhaps a few local investors or middle men, moderate incomes to local managers, and very little wealth returned to local employees and to the host country.

Poorly-managed foreign investment can actually hinder the development of the host country. Every company carefully guards its intellectual capital, which comprises such things as patents and practical knowledge of processes and organisational structures. The problem with investment by a foreign corporation is that the key knowledge will be retained at corporate headquarters. Key management skills may also be supplied by expatriates rather than being cultivated among locals. The result is that the host country and its facilities can be trapped in a dependency relationship. The foreign investment

provides some employment, but may not enable the client country to develop its domestic skills (or "human capital") and knowledge (or "intellectual capital").

The dependency trap can be a problem even for relatively developed countries if their governments are not alert to the problem. This has been true of Australia through most of the past century, since it was granted nominal political independence in 1901. In Australia's case two reasons can be identified. First, much of our business is foreign-owned. Naturally the overseas corporate headquarters do not want to cultivate a dynamic Australian business culture that will rise to compete with the home enterprises.

Second, Australians have a significant inferiority complex that derives from our colonial past and that is fostered by our continuing client-state role. We tend not to want to do something for the first time, but would rather wait until it has been proven overseas. We also tend not to believe our own people can be the best in the world, or (worse) we resent them if they are (except in sport). As a result our local financiers have little interest in local inventions. Our governments and financial culture have traditionally had a strong orientation towards servicing foreign investors (originally the British colonial masters). They would rather serve powerful masters or invest in fast-buck schemes like gambling and media than do the harder work of shepherding really productive local innovations to market.

Because of these cultural deficiencies, Australia has a long history of loosing creative ideas and inventions to overseas development. A couple of recent examples are a photovoltaic technology that has been turned into a muli-billion dollar business in China, and a solar thermal system that is being enthusiastically developed in California. The loss of promising innovations to overseas developers is an almost monthly, if not weekly, occurrence. However governments remain fixated on old technologies, like fossil fuels, that have no future, and are trapped in a quarry mentality, by which Australia confines itself to exporting unprocessed raw materials.

A major part of the neoliberal agenda has been to remove restrictions on foreign investment. The most notorious attempt was the Multilateral Agreement on Investment, proposed in the 1990s, which would have given foreign investors all the same rights as local investors. It would have been illegal to impose the kind of restraints required to ensure a net gain in wealth and capital in the host country. The details were negotiated essentially in secret between selected local government officials and officials of the World Trade Organisation. A groundswell of opposition eventually persuaded enough legislators and officials that there were serious flaws in the deal and it was abandoned in 1998. This was one of the first big examples of an internet-based campaign having significant political effect. The WTO agenda suffered another setback in Seattle in 1999, when its meeting was seriously disrupted by well-organised street protests. Officials and most media portrayed the protesters as an ignorant rabble, but they were a very broad and well-informed coalition of groups defending peoples' rights[56].

The neoliberal free trade campaign continued by other means. US strategy switched to making bilateral deals instead of a comprehensive multilateral deal. Since the US is the biggest economic power, it has been able to negotiate from strength, and it seems to have been very successful in knocking countries off one at a time. The so-called Australia-US

Free Trade Agreement imposed many of the same policies the MAI would have. As a result Australia's sugar industry is severely threatened and the net benefit to Australia is difficult for most impartial observers to discern. There is also serious concern that Australia's policy of subsidising drugs for the poor is vulnerable to further pressure from the US.

As well as the question of the net benefit to the nation of foreign investment, there is the separate question of the distribution of benefit. Just because a nation is richer in the aggregate does not mean most of its people are better off. We saw in Chapter 2 that the American median wage has been stagnant for thirty years, except for a modest rise in the late 1990s, even though America's wealthy have greatly increased their wealth. A significant part of that stagnation is due to the export of jobs, and to the threat of jobs being moved "offshore" exerting downward pressure on wages[17]. The material wealth of many Chinese is evidently increasing, though at considerable social and environmental cost. It is not clear that many Mexicans have even recovered the ground lost in the disastrous collapse in the value of the Peso in 1994, itself a product of neoliberal deregulation.

A big limitation on debates about the benefits of foreign investment is that the information that could resolve them is not even collected. There is aggregate information about the net flow of money and goods out of the country, but information about the loss of assets such as factories is not gathered. The flow of money tells only part of the story. For example, a firm may invest money in an overseas factory and a home factory may be closed. The total effect is the transfer of the factory and its jobs overseas, but the loss of the home asset is not recorded, so the total transfer of wealth is not captured just by counting the investment money that flowed overseas and the profits that flow back to the factory's owners. Nor is the associated loss of jobs properly counted. National employment figures are regularly collected, but there are many domestic causes also contributing to changes in employment. What is lacking is a breakdown that separates those jobs that have been lost (or gained) due to the transfer of assets to or from overseas. Part of the remedy for this lack of information is to calculate a full national balance sheet of assets and liabilities, along the lines to be discussed in Chapter 8, and as every public corporation is required to do.

Conversely, a host country needs to carefully monitor the net flows of inbound investment money and outbound dividend and interest payments. Even more importantly, it needs to ensure there are gains in human and intellectual capital as a result of the foreign investment, otherwise the country just remains trapped as a dependent client state. In Australia the nominally Labor, but actually moderately neoliberal, Hawke/Keating governments did impose some requirements on foreigners to invest in local human and intellectual capital, and these had some positive effect. However the strongly neoliberal Howard Government that took over in 1996 quickly removed those requirements and Australia has reverted to its traditional dependency status. China, and Japan before it, have been much more careful to ensure that foreign investment increases local development, with obviously successful results.

There are commonly some fearful people who hear any proposed adjustment to present arrangements in black-and-white terms. Thus anyone proposing to manage trade is liable to be labelled "isolationist", anyone proposing to manage markets may be labelled "communist", anyone proposing greater local autonomy may be labelled "survivalist" or "hippy", and so on. This book is about balance, not about extremes.

This chapter opened by contrasting the Australian Howard Government's belligerent treatment of poor and dispossessed foreigners with its sycophantic attitude to wealthy and powerful foreigners also anxious to penetrate our borders. It thus exhibited attitudes of both extremes: complete unconcern about economic borders, and a fortress mentality towards poor refugees. Healthy entities, be they organisms or nations, maintain borders that are neither total barriers nor totally open. Borders must be managed, but they do not have to be lined with fortifications. Borders can be markers of a transition between the domains of friends, as the US-Canadian border used to be (it is less so on the US side now) and as borders within the European Union are becoming. It is entirely appropriate that every community, of whatever scale, attends to its boundaries, to ensure that what passes through them does not compromise the community's health. That would hardly need to be stated if we had not been suffering a century or two of derangement.

7. *Taming Wild Horses*

The new view of economies as complex self-organising systems has two implications that reach to the core of the dominant economic regime.

First, there is not just one way to organise an economy. The neoclassical view is that free markets are the best of all conceivable ways to organise an economy, so that's what we must do. However if economies are complex self-organising systems then they have many possible states, and it is not possible to decide which is the "best" state, and even if it were that would probably soon change. It is not really a meaningful question to ask what is the "best" state when we can know little about the multitude of alternatives. We therefore need to use a different criterion. Rather than trying to choose what is allegedly the most efficient, we can endeavour, more pragmatically, to manage our economies to yield the kind of results we prefer. The results we prefer will depend on our situation and our culture, so each society and each culture may tailor its economy to support the kind of society it chooses to have. Thus we are not condemned to a global economic monoculture, nor to its consequent political and social monoculture. Human cultural diversity might thrive once again.

Second, there is no fundamental reason why an economy can't be compatible with the living world. If an economy is a complex self-organising system, like living systems, then it could be brought into compatibility with living systems. Our present economy violates the biosphere's operating principles and is highly incompatible with living systems, which is why so many living things, including people, are dying. It is also so grossly mismanaged and unstable that its behaviour may be chaotic rather than complex. With sensible management and careful exploration, we ought to be able to stabilise our economies and return them to being good biospheric citizens, so that people and other living things may thrive within them and around them. That is our challenge. It is also necessary, if our civilisation is to continue.

Together, these conclusions imply the economy can be restored to its proper place, which is within the biosphere and subordinate to and supporting the kind of societies we choose to live in. There need not be any conflict between the economy and social needs, nor between the economy and the environment. The economy should be supporting both.

The question then becomes how to modify our economies so they move towards these possibilities.

It is a matter of observation that markets are powerful. The operation of modern competitive markets provides strong incentives for firms to improve their product, to innovate, and to run more efficiently. Unfortunately modern markets, as currently mismanaged, also provide strong incentives to increase production without limit, and strong incentives to avoid costs, which means shifting costs onto others and onto the biosphere. Furthermore unfettered competition tends to eliminate competitors and to yield monopoly, because established firms often enjoy advantages of management, marketing, distribution and so on that make it hard for new firms to break in. The negative results occur because there is nothing in theory or practice that says unfettered markets will deliver desirable results. As we have seen, the invisible foot is as likely to operate as the invisible hand.

So, do we have to give up on markets and all become socialists? I don't think so. The problem is not markets *per se*, the problem is *unfettered* markets. The lesson is that markets should not be left to themselves. Rather, we should treat markets like wild horses: they are powerful, but they need to be tamed and guided if we want them to take us where we would like to go.

It may seem that not much can be said about managing economies if they are complex systems that are intrinsically unpredictable. However the unpredictability applies to the *details* of their behaviour. There is still much that can be said about the *character* of their behaviour. We are familiar, for example, with the dogness of dog behaviour, and we can readily distinguish it from the catness of cat behaviour. This is true even though we may not be able to predict, in a particular situation, if a threatened dog may grovel, or run away, or attack. There are still sensible ways to treat a dog, such as not threatening it, or if it feels threatened then not cornering it.

We need to get to know, as well as we can, the nature of the economic beast we are dealing with. Our goal is not to try to control the detailed behaviour of the economy, but to manage its overall trends and general character. For example, obvious present trends are to increase material throughput and to rapidly degrade the natural world, and we would be wise to reverse both of those trends. The character of the present economic regime is to be erratic and brutally indifferent to the fate of individuals, whereas an economy that is more stable and takes care of individuals as well as abstract aggregate measures would have a more benign character.

We can begin our reassessment of the nature of an economy with the recognition that an economy is not a piece of clockwork, it is a living system. As I have already noted, economies are embedded in human societies and an organic world, and so important parts of them are literally alive. Peoples' taste for fashion and the collapse of a soil's microbial ecosystem are just as much a part of an economy as factories and finance.

On top of the complex responses of their living components, modern economies have their own complicated internal feedbacks, some that tend to stabilise them (invisible

hands) and some that tend to destabilise them (invisible feet). An example of instability that we have already encountered is the runaway growth of a firm that gains a lead in economies of scale. It is the presence of strong internal feedbacks and resulting instabilities like these that generates the sometimes-erratic behaviour characteristic of complex systems. It is also the internal feedbacks that make economies tricky to manage, because their responses are hard to predict. We need to be cautious with our interventions, carefully monitoring their effects and being willing to back off and try a different approach. We certainly need to avoid claims of universal panaceas. We also need to restrain our governments, who love to change things with gay abandon and with little effort to verify effects. They do this not only because of ideology, but also because politicians want to be seen to be fixing things.

Guiding markets is not a new idea, we have been doing it for a long time. There are two main traditional tools: rules and incentives. A third, reconnecting feedback pathways, will be introduced shortly. Incentives affect what is profitable and what is not. Where the profit is, markets will follow. So long as it is profitable to exploit people and trash the Earth, we can expect that people will be exploited and the Earth will be trashed. If we want that to change we must find ways to make it profitable to treat people and the Earth well. There is a long history of applying subsidies and taxes to influence what is profitable. Subsidies are positive incentives, whereas taxes are negative incentives. Market operation can also be changed through rules, usually referred to as regulation. This is a blunter instrument, but it also has a long history.

Incentives affect the feedbacks that operate within the economy, and feedbacks are what determine the character and behaviour of a complex self-organising system. When a market functions according to the neoclassical claim, our individual actions are collected through a stabilising (negative) feedback system and the collective result is a benign outcome – the invisible hand does its work and prices come to an equilibrium. However in some situations, as in an unregulated common or a falling market, our individual actions are collected through a destabilising (positive) feedback system and the result is not benign – the commons are eaten out, and the market crashes. The invisible foot takes over and there is a dramatic instability.

To give economists some credit, many have long recognised some examples of what they call market failure, and agreed that intervention is necessary to achieve a good result. A pertinent modern example is the destruction of natural habitat that supplies "ecosystem services" to people in such forms as clean air and water, a resilient natural world, potential medical cures and so on. The difficulty is that a firm that destroys habitat gains the profit, but does not have to bear the full costs, which are spread across the whole community. This is an example of the so-called *tragedy of the commons*. The solution proposed by economists is to impose a tax on such firms so the cost of their activity is "internalised", their prices reflect the real costs, and the market can then work properly. Pollution is another case of market failure. Sir Nicholas Stern, reporting in early 2007 on the likely costs of avoiding global warming, called the pollution of Earth's atmosphere with carbon dioxide emissions "the greatest market failure in history". Really though, it is part of an

even larger failure – the failure to protect the natural environment as a whole. Rather than pretending that bad outcomes are the exception, an "imperfection" in an otherwise orderly system, we must recognise that bad outcomes are common, or even these days the rule.

Another well-known example of market intervention is the progressive income tax, which intervenes retroactively in the labour market by taxing high-income earners at a much higher rate than low-income earners. Not all economists agree this intervention is justified, but many societies make the political decision to intervene, either because they think it yields a healthier and more cohesive society or because they consider it immoral not to help the less fortunate among us, or both.

However a better solution to extremes of income would be to address the problem closer to its source. To do this we need first to recognise there are artificial mechanisms that pump wealth from the poor and middle class to the rich, examples of which are noted through this book. If we remove those mechanisms, or modify them, then we might achieve the result more efficiently and effectively. Poor people would be rewarded more in proportion to their contribution, rich people would have to pay more of the costs of production, incentives and costs would be better aligned with goals so markets would function more efficiently, and a costly tax bureaucracy could be reduced or eliminated.

The latter approach would be an example of redirecting the connections within the economic system so feedbacks flowed differently. This is a less recognised approach to economic management, but it can be a more effective way to shift the behaviour of the economy than just changing the strength of an existing feedback using incentives or regulations. It requires more creativity, and we will encounter some creative examples as we go along.

There may also be situations in which we choose to exclude markets. Natural monopolies, such as the distribution of water and electricity, used to be widely recognised as requiring a different form of management, run by or monitored by government. Privatisation under the neoliberal regime has generally resulted in poorer and often more expensive service, due to cost cutting and excessive share-holder profits. Perhaps the most spectacularly poor example was the privatisation of the California electricity market, which resulted in customers suffering brown-outs and losing billions of dollars, and the subsequent collapse of the principal corporate villain (Enron). Natural monopolies should be carefully considered individually to find workable arrangements.

If markets need to be managed, there is clearly a role for government. The government's role is to monitor the results of markets, to monitor our collective opinion as to what kind of society we want, and to design and adjust policies so markets will yield better results. Such results will need to be judged much more broadly than at present, according to the quality of society and quality of life we achieve, a subject taken up in Chapter 8.

In practical terms the changes required to manage markets sensibly are not so radical. The big changes are in the recognition of the beast we are dealing with and in the overall intention of our management. We need to run our economies without the fundamental misconception that markets can be left to run themselves, and we need to free the whole subject from the messianic ideologies with which it has been plagued for the past couple

of centuries. Indeed the existence of those messianic movements is symptomatic of the lack of firm grounding of the discipline of economics which, as we saw in Chapter 4, is pre-scientific. We also need to abandon the implicit and insane goal of increasing material production without limit, and to manage instead for improved quality of life.

In other words the implication of the failure of the neoclassical paradigm is not that we need radically new kinds of policy instruments. Rather it is to remove a persistent objection to the kind of market intervention we have been doing anyway, but fitfully, incoherently and often counter-productively. With a clearer justification for intervention, and with a clear intention and a clearer political will, we are likely to manage more coherently and therefore more effectively.

Some of the changes required to rein in the wild horses and stabilise the economy are fairly obvious, though the task of identifying such measures will continue indefinitely. Here is a brief shopping list of some of the main types of reform. (1) Shift profit incentives so they support quality of life instead of exploitation. Big steps in that direction would be to eliminate perverse subsidies and to correct other perverse incentives. (2) Stabilise the financial markets. (3) Take more control of trade and international transfers of money. (4) Promote alternative forms of ownership and investment. (5) Use alternative forms of money supply to eliminate or manage some dysfunctions, including inflation of the prices of fixed assets, like land, which is an important source of inequality. (6) Revise national accounting so good things are valued, and pollution, over-exploitation and other consequences of mindless growth are properly counted as costs. Ownership, investment, trade and the role of money will be taken up in later chapters. We will also look later at better national accounting, which must include balance sheets of assets and liabilities along with income and expense flows.

Though the list of reforms may seem challenging, many of the things we need to do are already being done, but incoherently, inconsistently or counter-productively. Great improvements could be made just by eliminating many expensive and counter-productive interventions, such as subsidies that benefit minority interests at the expense of everyone else. Beyond that there are some creative and promising approaches that can be applied widely through our economy. Here I will focus on just a few important mechanisms.

Producers must pay full costs

It is fundamental to the proper operation of markets that producers pay the full costs of production. Those costs are then reflected in the prices charged for products, and purchasers can decide if the products are worth that price. Judged by this fundamental requirement our present system is highly deficient, because there are far too many ways in which producers avoid paying full costs. They do this for example by polluting, by extracting renewable resources at unsustainable rates, or by underpaying employees. To take the outstanding current example, our producers are not required to pay the full cost of burning fossil fuels in the course of production, and the atmosphere is polluted by excess carbon dioxide as a result. Any activity that imposes a burden on or fails to fairly reward others, or that reduces the capacity of the Earth to support our children, is avoiding costs that properly belong to that activity.

Eliminate perverse subsidies

Many activities that harm society and the environment are subsidised for the short-term benefit of a few. For example, the Australian and United States governments provide large subsidies to the fossil fuel industry. The subsidies take many forms, direct and indirect, including fuel tax breaks for primary producers, tax breaks for company cars and funding for research and development. One estimate puts the total value of Australian subsidies at more than $12 billion per year in an economy less than one tenth of the US economy[57]. Yet Australia's fossil fuel industry is one of the dirtiest in the world, because of burning brown coal for electricity, and as a result Australia is the highest emitter per capita of greenhouse gases. Because of these perverse subsidies we are forced, literally, to pay extra to pollute the world. The subsidies also make it difficult for renewable energy and energy efficiency technologies to compete. Subsidies for those alternatives were always small by comparison. In Australia they amount to around $1 billion, 12 times less than fossil fuel subsidies, and some of that would be for less dirty technologies rather than clean technologies.

There are many other examples of perverse subsidies from around the world[58,59]. Germany paid $6.7 billion per year, or $73,000 per worker, to subsidise the Ruhr Valley coal regions, whose high-sulphur coal contributes to acid rain, forest die-off, lung disease and global warming. The US pays $800 million per year to subsidise the production of tobacco, which causes disease and death, much of whose financial cost is also borne by taxpayers. Agricultural subsidies in the OECD countries cost $300 billion per year, yet it would cost only $40 billion per year to raise agriculture to Western productivity levels in poor countries whose people do not have enough food. Hidden costs of cars are estimated at over $460 billion per year in the US; these include tax-payer funded road construction, the cost of the 1991 Gulf War (but not Gulf War II, which should also be counted), urban sprawl, urban decay, air pollution and so on. Nuclear power has always been heavily subsidised, through research, through limitations of liability for accidents, and especially through not having to bear the full costs of decommissioning old plants and "safely" disposing of radioactive materials.

Few appreciate the scale of subsidies globally. Dr. Norman Myers[58] estimated in 2001 that about $2 trillion is spent per year on subsidies that encourage perverse results, results that simlutaneously harm economies, people and the environment. There is a reason this enormous total is not well-known. No government in the world regularly and systematically tallies the subsidies it pays. Governments themselves have a perverse incentive: to cover up the vast sums of taxpayers' money they waste by paying off influential interest groups.

The implication of such widespread perverse subsidies is that we could substantially improve the operation of our economies and reduce their effect on the environment while simultaneously saving large amounts of money. We can save the Earth and make money too.

Weed out inadvertent perverse incentives

A perverse incentive is created for example when electric power companies' profit is proportional to the total quantity of electricity they sell. This promotes excessive and

wasteful use of electricity. Most resource suppliers are rewarded in this way - the more they extract from the Earth, the greater their profit. A remedy for this kind of perverse incentive is to allow the company to share some of the savings its customers make through energy efficiency measures. California pioneered this approach in the 1990s, by requiring its electric utility companies to finance energy-saving measures for its customers and giving the company a share of the resulting savings on electricity bills[60]. In effect the utilities were induced to sell efficiency rather than inefficiency.

Unfortunately that pioneering and successful experiment came to a bad end when free-market ideologues decided to privatise the electricity market, including separating wholesale and retail marketing. This was done so badly that the wholesale market was comprehensively manipulated by Enron and other companies, resulting in both brownouts and the ripping off of billions of dollars from California customers and the State. Subsequently Enron itself failed in one of the biggest corporate scandals in US history.

Perverse incentives can result from inattention as well as through active interference in the market. Amory Lovins[60] has pointed out that virtually every one of up to two dozen parties involved in a large building project works under a perverse incentive - the more the project costs, the larger will be their fee. These incentives operate even though the overall contract may have been awarded to the lowest bidder. Such incentives promote waste, because the building tends to be under-designed and over-engineered, which minimises the up-front cost but increases long-term recurrent costs. For example little attention may be paid to the energy efficiency of the overall design, and then oversized heating and cooling plants installed to compensate. The energy contractor has no incentive to improve the design because that would reduce the size of the heating and cooling plant, which would reduce the contractor's fee. The remedy is to draw the contract up so that both efficiency and cost savings are rewarded, for example by giving the contractor a share of savings from energy efficiency, relative to an agreed benchmark, over the first few years of the building's operation. This creates an incentive for the contractor to come up with a better-integrated design in which components of the building work with one another instead of at cross-purposes. This approach generally yields far greater efficiencies than adding energy saving features to an intrinsically inefficient design.

A creative innovation: lease, don't sell

The example of the electric utility's profits being proportional to the amount of power it sells has a more general analog that pervades the economy: most firms' profit is proportional to their throughput, and this promotes wasteful use of resources. It may seem that this is just in the nature of doing business and not much could be done about it. However the incentive to waste can be reversed. Later in this book we will see how our use of resources might be reduced even more dramatically.

A creative remedy to the incentive to waste was pioneered by the billion-dollar carpet manufacturer Interface Inc. The CEO of Interface, Ray Anderson, decided he wanted to transform the company from an Earth degrader to an Earth restorer[61]. He set his company to do several things, including eliminating toxic dyes and developing recyclable materials.

However his most far-reaching change was to switch from selling a product (carpet tiles) to providing a service (floor covering). In other words, rather than simply selling and installing office carpet, Interface undertakes to maintain attractive floor coverings as a continuing service. In adopting this role, Interface reversed its own incentives regarding its product. Before the change, its profit was proportional to the amount of carpet it sold, and there was an incentive to make the carpet as cheaply as possible so it would need replacing as often as possible. After the change, its incentive was to make the carpet as durable as possible because Interface, not the customer, was paying for the replacement of worn carpet. Before the change, Interface produced broadloom carpet, most of which is ultimately wasted when it is dumped because some patches of it are worn. After the change, Interface sole carpet tiles, and only the worn tiles need replacement. Best of all, Interface's business and profits increased.

Increase the leverage of beneficial incentives

Another important lesson came out of the California experience with its electric utilities. One of the responses of the utilities to the requirement to help customers save energy was to offer rebates to customers who installed compact fluorescent light bulbs, which are much more efficient than the old-style incandescent bulbs. But the utility found it was more cost-effective to offer an incentive to stores to carry compact fluorescents. Then it worked its way further back along the supply chain through distributors to manufacturers and designers, offering them subsidies for more efficient products. At each stage the leverage of the utility's rebates was increased, with the result that compact fluorescents became widely available and their price dropped substantially because of the economies of large-scale manufacturing.

Looking at these examples from another perspective, in effect Interface and the electric utilities were selling end-use services rather than just a product. As Amory Lovins puts it, people don't want electricity, they want cold beer and hot showers, and the power company was helping them to get those services in a different way.

Providing a service rather than selling a product might be extended to many industries. A car manufacturer might provide a transportation service, undertaking to provide you the means to get from A to B at your convenience and in the style you prefer. This would differ from the usual car rental arrangement in that the manufacturer would be responsible for maintenance and fuel, thus ensuring the incentive stayed with the manufacturer to make the car as durable and fuel-efficient as possible. Obviously long-term arrangements would be desired by many customers. Although such arrangements may seem at first like a big change, they would require only adjustments to existing dealership and leasing arrangements. We should not underestimate the adaptability of private enterprise.

Combinations of the above mechanisms might also have particular advantages. For example Amory Lovins advocates "feebates". The idea is to use a combination of fees and rebates, penalising undesired behaviour and subsidising desired behaviour. The amounts can be arranged to be approximately revenue-neutral so that the policy avoids the political charge of just raising taxes. For example, cars with high fuel consumption can be taxed

and cars with low fuel consumption subsidised with rebates, so as to promote fuel efficiency. As the mix of cars changes in response, the feebates can be adjusted to remain approximately revenue-neutral. Continuous adjustment would also preserve the feebates' effectiveness, since if most cars became fuel efficient and claimed rebates their would be less differentiation of incentives between the very efficient and the not-so-efficient. This scheme would also have the advantage of applying to the upstream end of manufacturing where it would be most effective, since it would be a direct incentive to manufacturers to improve the fuel efficiency of their vehicles. Another example of feebates would be to use revenues from a carbon tax to subsidise efficiency and renewable energy and to compensate low income earners.

An alternative to taxing pollution is to introduce so-called cap-and-trade schemes. There is much discussion about the use of such schemes to reduce greenhouse gas emissions. The idea is to impose a limit or cap on the total amount of emissions by a country in a given year and to auction permits for portions of those emissions. The cap can be progressively reduced from year to year. Large emitters would have to buy a lot of permits, whereas small emitters would require only a few permits. Thus the scheme penalises large emitters and imposes an incentive to reduce emissions. The permits would also be tradable. Thus if a company's emissions were lower than the total of its permits, it could sell excess permits to another company whose emissions were exceeding their permits. Cap-and-trade schemes are therefore more flexible than simple regulation, as they allow companies some room to adjust as circumstances unfold. By creating a market for trading the permits the scheme also allows the companies involved to use all their information about their situation, and thus avoids the limitations and expense of a bureaucracy trying to gather the information. This of course is a strength of markets in general.

One of the main advantages of tradable permits is that they allow for the most cost-effective upgrading of equipment and plants. It is more cost-effective to upgrade an old factory than a new one, because the old factory will be due for renovation anyway. Thus a relatively new factory that does not have the latest low-emissions technology can keep operating for a time by buying permits, whereas an old factory that is upgraded to the latest low-emissions technology can sell permits. Although this might allow the less efficient factory to operate for longer than it otherwise would, the overall societal goal is still expressed in the total cap on all sources.

Cap-and-trade schemes are an alternative to taxes, and in broad terms are similar in their effect. The difference is that cap-and-trade schemes set the quantity and create a market in permits to set a price, whereas taxes set a price and leave the market to set quantities. Either mechanism could be used to progressively reduce greenhouse emissions or other pollutants, and the choice is a political one.

A cap-and-trade scheme was used very successfully in the United States to reduce emissions of sulphur dioxide from coal-fired power plants, which damages ecosystems by causing acidity in soil and lakes. The emissions were actually reduced ahead of schedule and at much lower cost than the industry claimed ahead of time. In fact the costs were lower than anyone forecast, even environmentalists[60].

On the other hand cap-and-trade schemes are also prone to political abuse and market manipulation. The European Union introduced a cap-and-trade scheme for greenhouse gases in 2006, but it left individual countries to determine the number of permits, and it handed out the first round of permits free rather than auctioning them. Too many permits were issued, and by giving them out free the largest emitters were subsidised instead of penalised, because they could later sell the permits and gain a windfall profit. The Australian Government proposed a scheme in 2009 that gave even more generous subsidies to polluters, and the US Congress seemed to be heading in the same direction in 2010. The US scheme ultimately was defeated by political opponents. The Australian scheme was first abandoned then picked up again in tumultuous political circumstances. A modified scheme is likely to pass the Parliament in 2011. It still excuses the main polluters from most of the costs of their activities, but it has some improvements over the previous proposal thanks to the influence of the Greens party.

The effectiveness of the permits has also been diminished by being packaged in so-called derivatives and becoming objects of speculation. Such devices lead to market instability and malfunction. Given the history of incompetent implementation and abuse, it may be that a tax would be preferable, and simpler. A carbon tax could be imposed on distributors, of whom there is not a large number, whereas a large fraction of carbon dioxide emissions are created by individuals driving vehicles.

Climate scientist James Hansen[62] has proposed a variation on these possibilities that he calls *fee-and-dividend*. Basically he suggests a fee can be charged on fossil fuels as they enter a domestic market - at the mine, at the well head or at the port. The money collected is then paid directly and regularly to residents equally, or to every family according to a simple formula. The virtues of this proposal are simplicity and transparency. The number of sources is far less than the number of users of fossil fuels, so an elaborate regulatory bureaucracy is not required. The fee would increase steadily according to a published schedule, so business could adapt investments accordingly.

Hansen gives some indicative numbers for the US. He suggests 100 percent of the fee be distributed monthly to the public as electronic deposits to the bank account or debit card of all legal residents, with half shares for children, up to two children per family. By the time the fee reaches $115 per ton of carbon dioxide (equivalent to $1 per gallon of gasoline) the dividend would be $2,000-$3,000 per legal resident per year — $6,000-$9,000 for a family with two or more children. People who keep their carbon footprint smaller than average will make money. The gradual rise of the fee would give people a chance to choose more efficient vehicles, insulate their homes, and so on. The dividend would help people afford these investments. Jobs would be created as society retools the economy from high-carbon to low.

We can recognise this proposal as a feebate scheme - a fee that is fully return as a rebate. The fee is like a tax, but the scheme is both revenue neutral and transparent. This would ensure the the government did not use it as an extra source of general revenue, and that big business did not loot it, through compliant politicians, for special favours. Its virtue is also its political weakness in the present political climate. It would obviously provide a big incentive to reduce the use of fossil fuels, and therefore of profits of the fossil

fuel industry. Only when people demand change in the political climate, and vote accordingly, will such a scheme be politically feasible. But that is the point of this book.

The wildest horses of our present economy are to be found in the financial sector. The financial sector comprises stock markets, currency exchanges, investment funds and a range of related institutions. Many banking activities are also included, such as equity investment (the investment of existing wealth) and savings accounts. Banks also create money as they make "loans" (this is not widely appreciated or is often misunderstood), but that activity properly belongs in a separate category, the monetary sector, that we will look at in later chapters.

The role of the financial sector should be to service the productive economy, by which I mean those activities that produce useful things. It is, or should be, part of the service economy, and although it is very important it need not be a very large segment of the economy. Yet even in 1998 the turnover of the Sydney stock exchange was over $A30 trillion. At the time the Australian GDP was about $A450 billion. Thus the rate of financial trading was roughly seventy times faster than the nominal rate at which Australia was generating wealth. That seems a little excessive. A little earlier, in 1993, the global rate of financial trading was equivalent to turning over the entire global stock of publicly traded assets in 24 days. This is about fifty times faster than necessary. Currently global currency is traded at about $4 trillion per day, about 75 times what is really needed, as we noted in Chapter 2. A different kind of estimate yields a similar conclusion. Prior to 1973 currency exchange rates were regulated and currencies were traded at a rate of $US10 to $US20 billion dollars per day. Two decades later, after the deregulation of international finance, currencies were traded at a rate of $US1200 billion per day, a jump by an even larger factor, between 60 and 120.

The Australian financial sector's profits as a share of GDP quadrupled since 1990[63], and currently it draws about one third of corporate profits. According to a summary in mid-2011, US financial sector profits as a fraction of all corporate profits were, in 1995 34%, in 2001 46%, in 2006 41%, and in 2011 45%[64]. Evidently the financial sector is not a small part of the economy in either country.

Apologists for the financial markets argue that active trading is required for prices to overcome "stickiness" and reach their true value. However their perception of stickiness is relative to the rapid fluctuations in the present market. In a market trading at a more sensible rate the fluctuations would be much smaller and slower and the need for "liquidity" would be correspondingly lower.

Apologists also argue that traders' estimates of value tend to average out to the true value, implying that more trading is better. For both of these reasons they argue that the high levels of trading help to efficiently allocate capital to investments, which is supposed to be the purpose of the financial markets. However real-world markets do not fit these suppositions. Detailed analyses have shown that market fluctuations are not the random walk that apologists suppose, but consistently fit a power-law distribution. They have a greater frequency of big jumps, which are a sign of overshooting and overcorrecting[39]. Other studies have shown that market value has deviated for long periods from what

most economists would regard as good estimates of "true" value[39]. Neither do you need detailed analyses to demonstrate the point, as we have already noted. The 1987 stock market crash changed the traders' collective estimates of value by around 30% globally within one day, even though nothing in the real world had changed significantly. The change was only in the perceptions of market players, whose bubble-world of clever strategies was punctured by reality.

The correct conclusion is that the financial markets are seriously malfunctioning. When the rate of trading is 50-100 times what it needs to be, the clear implication is that 98% or more of trades are for speculation. It also follows that the markets are dominated by their own internal dynamics rather than following changes in the real world. The detailed models recounted at the end of Chapter 4, of supply chains in the Beer Game and simple trading systems in the spice world, illustrate this expectation. They developed complex behaviour, and fluctuated widely around a theoretical equilibrium. Nor did their behaviour average out to a reasonable result - their average performance was much less than optimum[39].

The result is that financial markets are parasitic and they are destabilising: their wild fluctuations degrade the performance of the productive economy. The estimates of required trading rates given earlier suggest that the financial sector should comprise a few percent of the total economy, but it is currently siphoning off thirty or forty percent of corporate profits. That profit is far beyond the proportion of its positive contribution to the economy. Worse, the fluctuations in financial markets cause serious disruption, because the large gyrations in share prices and currency exchange rates inhibit the productive economy. Managers cannot optimise their management for medium to long term wealth creation, but have, instead, to hedge against sudden changes in their costs or capitalisation. Thus the financial sector is imposing a double burden on the productive economy.

The financial sector also goes through long cycles. Hyman Minsky proposed his *financial instability hypothesis* to explain them[65]. In good times, such as prevailed until 2007, the financial sector draws large profits and is very powerful. That was also true in the 1920s and in earlier boom times. Its malfunctioning eventually brings on a crash, and the ensuing recession or depression dramatically reduces its power, as borrowers and lenders both are forced to be cautious about creating debt. But then a slow buildup of power begins as the economy recovers. After a decade or two of stable growth a new generation becomes more confident and begins to take larger risks with debt. This induces a "euphoric" economy as participants begin to believe the good times will continue indefinitely. Eventually the burden of debt becomes too great and the system crashes again.

The financial markets need to be stabilised, and they need to be returned to their proper place, which is to serve the productive economy. One remedy that seems likely to be highly effective was proposed some time ago, but it has never been tried. The remedy is to impose a tax on transactions that is just large enough to take most of the profit out of speculative trading. This is often called a Tobin tax, after James Tobin, who proposed in the late 1970s that currency exchange transactions should be taxed by around 0.2% to

reduce speculation-driven fluctuations. The same principle could be applied to stock markets, where the tax might need to be higher, perhaps around 1%.

Recently this proposal has gained some prominence under the title of a Robin Hood tax. I think this misses a basic point. The main point is not to raise revenue but to stabilise the financial markets, because this is where the greatest benefit would arise. An effective tax would greatly reduce the number of transactions, and therefore the potential revenue, although the revenue might still be substantial. More importantly, the taxes would force traders to focus on longer-term prospects of wealth creation rather than short-term fluctuations in price. They would prevent most of the parasitic siphoning of wealth from the productive economy. They would allow managers also to focus on medium to long term wealth maximisation rather than on quarterly dividends to share holders. This single action could be of immense benefit to economies everywhere.

There are other possible actions that would keep financial markets under better control. For example credit availability can be more directly managed, as will be discussed later, and international money transfers can be regulated. Such controls were routine only a generation ago.

Many other insights and creative possibilities in the adjustment of market mechanisms can be found in Eric Beinhocker's extensive summary in *The Origin of Wealth*[39]. A more extended discussion is also given in *Economia*[1], and some other aspects will be covered in later chapters.

There will always be a tension between society's wish for business to improve the general good and an individual business's interest to maximise profit. It will usually be more profitable to pollute than to neutralise or avoid pollution, it will always be profitable, in the short term, to underpay employees, and speculation will always tempt financial traders. Therefore a basic level of vigilance and protection against exploitive practices will always be required.

Over the past century or more the social democracies have also addressed these problems by imposing regulations, such as imposing fines on polluters who get caught, requiring a minimum wage to be paid to employees, or outlawing insider trading in financial markets. During the neoliberal era these protections have been weakened by various means. Funding to some bodies that regulate pollution or safety has been quietly reduced, some industries have been place under "voluntary compliance" requirements, financial markets have been dramatically deregulated and a general political culture of looking the other way has developed. In the United States this culture went further, with the attitude of the radical-right G. W. Bush administration seeming to be that business can do no wrong. Ensuring fair pay to employees has never been a strength of the United States, and Australia's comprehensive and generally effective system of minimum wages and award pay scales was weakened by the Hawke-Keating Labor governments and effectively demolished by the radical-right Howard government.

Protections need to be restored and strengthened by the most effective means we can devise. Regulation is a blunt instrument, and market mechanisms are preferable if they

are effective and sufficient. However where market mechanisms are not sufficient there is no substitute for regulating abuses, and for adequately enforcing the rules. Difficulty is no excuse: neither is it easy to ensure that everyone pays their fare share of taxes, but we don't just give up and stop collecting taxes.

The modern form of market economy is globalised consumer capitalism. Consumer capitalism manipulates us to buy ever more stuff, so as to continually increase its flow of profits and so as to "keep the economy growing". Through the operation of this system we have become obsessively materialistic. We have also, I'm afraid, become progressively more infantile in our appetites. Homer Simpson, on being told his microwaved food would be ready in forty seconds, whined "Forty seconds? I want it now!". The beauty of consumer capitalism, from the point of view of capitalists, is that it is addictive. It offers us a never-ending stream of things that will supposedly make us feel better about ourselves, but whose emotional effect soon wears off, so we keep coming back for more. And they have just the dope for us. It's a fool-proof recipe for ever-increasing profits – until physical limits interfere. At some stage we will have to come to grips with consumerism and its driver, marketing, so we can return to having what we need rather than what we are manipulated to want.

To strain the metaphor a bit, the wild horses are bucking and rearing and pulling in different directions. They are no longer moving us forward very quickly at all and they've begun to break up the buggy. If we can rein them in and get them pulling in the same direction we may find we progress far more quickly and easily than we imagined was possible.

Part 3: Counting and Owning

There are other issues, not strictly related to the central economic theory, that profoundly distort our economies. The book-keeping that supposedly informs us of the state of our economies is ludicrously incomplete and misleading, and its use seriously distorts economic priorities. There are many more kinds of ownership, and associated forms of investment, than are usually considered in conventional rhetoric and theory, and these offer ways to ensure rewards, and responsibilities, flow more equitably in our societies. Emergent community wealth does not rightfully belong to any individual.

Our system of supplying money owes more to medieval money changers than to any theory or sensible intention, but that is such a big and tangled subject it deserves its own section.

8. *Counting What Counts*

There is a widespread and growing sense, in rich countries, that we are losing our direction in life. Many people agree we are too materialistic, we work too much, we feel stressed and we don't spend enough time with family and community. We suffer from diseases of affluence like obesity. We worry about our effects on the environment, and especially about global warming. There is a pining for a simpler life, manifest in popular TV shows depicting people dropping out of the rat race and moving to a small community.

However these feelings are often ambiguous. We are confused and conflicted. We may pine for simplicity even as we work obsessively, drive large, planet-destroying vehicles and buy so much stuff we don't have room for it all in our over-large houses. We don't know how to resolve these internal conflicts. We like having our stuff. In fact it might feel like an affront or failure to give some of it up. Yet we still have a feeling there ought to be more to life.

The feelings of attachment and the feelings of dissatisfaction both have genuine causes, though both are not necessarily desirable or healthy. On the one hand, our lifestyle *has* become highly materialistic, and we have more limited family and community lives and possibly less satisfactory spiritual lives than people used to have a generation or three ago. On the other hand we are part of a system of our own creation, a machine if you like, whose overriding purpose has become getting us to want, make and buy ever more stuff. The system also has highly refined means of inducing us to do its bidding.

Our feelings of confusion come, first of all, from not recognising that our system's purpose *has* become so starkly simplified. Nor do we usually realise how powerful are the pervasive inducements to want stuff. Our confusion also comes from not knowing how we might deal with the system. Dropping out does not seem to be a viable option, though a surprising number of people are going part of the way, by *downshifting*, in other words by taking a voluntary reduction in income to improve their quality of life[66]. Even less clear is how the system could be changed, it seems so powerful, even inevitable.

In poor countries the reality and feelings are probably less complicated. People are still poor. Some of them are significantly poorer than they were a few decades ago. They feel the pull of the materialistic lifestyle through our TV programs, but that lifestyle is simply out of reach.

Economics has a reputation for being clever and sophisticated, to the point of being impenetrable to most people. Thus it may be surprising that one of its primary deficiencies is that it doesn't meet even the most elementary requirements of accounting. You don't need a PhD to understand the problems, you only need to be able to add and subtract, and to know a little about how a business keeps its books.

In fact if you can add and subtract you may be a jump ahead of the economics profession, which overlooks the subtraction part when it counts our collective incomes. It adds up incomes but forgets about expenses. It even counts many expenses as income. These elementary errors are among the important reasons why the economy is managed so as to try to keep it always growing, and the inexorable growth of the economy is why the planet is on the verge of collapsing around our ears. It's an important little oversight.

A second problem with economics is that there is no balance sheet of assets and liabilities, as distinct from income and expenses. At least if there is no-one seems to talk about it. This may be a little surprising, because politicians are always telling us we're richer than we used to be. But how could we know we're richer if we don't periodically count our wealth?

To get at the first problem, the missing subtraction, we have to be clear what economists mean when they say "the economy" is growing. What they really mean is the Gross Domestic Product is growing. The GDP is, basically, all the money we've spent in a year. Since we spent the money to buy things, the GDP is also the total worth of the things, the "goods and services", we've produced. The detailed calculation of the GDP involves details we don't need to go into here, such as care to avoid double counting and adjustments for money and things flowing in and out of the country, but basically it's how much "monetary activity" there's been. Putting it another way, it's the monetary value of all the paid work that's been performed.

There are some things to notice about the GDP. First, its calculation doesn't depend on whether the paid work was useful. Second, unpaid work doesn't count, even though there's quite a lot of it. Women especially may want to pay attention to the second point.

The significance of the first point is illustrated by a few examples. If a chemical company produces $3 million worth of chemicals but in the process creates pollution that takes $1 million to clean up, you and I would say we were only $2 million better off. However our economic accountants would *add* both numbers into the GDP and say we were $4 million better off. It's as though they haven't heard of subtraction.

A few years ago when bushfires raged into Canberra, then my home town, and destroyed about 500 houses, the local economy was boosted, according to economists. Ralph Nader once noted that every time there's a car crash the GDP goes up. The cleanup of the huge oil spill resulting from the grounding of the oil tanker *Exxon Valdez* in Alaska noticeably increased the US GDP. The problem, you see, is the GDP only measures paid activity, not what the activity is, nor whether it's beneficial.

If a shopkeeper entered all his transactions in the credit column of his ledger and none in the debit column, then announced that his Gross Shop Product was booming, his family

might rightly despair of his stupidity. You may think I must be making this up, but I'm afraid that's how our national accounts are kept.

The GDP is used as though it measures our wellbeing, or at least our "standard of living", but the GDP only tells us how busy we've been, not whether our "activity" has been useful, useless, harmful or cleaning up the mess from natural or man-made disasters.

The inventor of the GDP, an American named Simon Kuznets, never intended it to be used as a measure of our general wellbeing, and in fact he specifically warned against such use. He wrote in 1934 "The welfare of a nation can scarcely be inferred from a measure of national income as defined above". Kuznets presumably understood that you have to worry about *what* you are doing, as well as *how much* you are doing. The GDP could be a useful tool for managing the economy, as Kuznets intended it, so long as someone pays attention to *what* is being produced. This was certainly true during World War II, when the GDP came to prominence, because the US Government was very concerned to maximise the production of war-related things, and it intervened very directly in the economy to ensure the desired mix of activities occurred. However our current masters believe free markets will automatically ensure all activity is beneficial, so they think they don't have to pay any attention to what people are actually producing.

It is nonsensical to use the GDP even as a measure of our material "standard of living". Even less is it a useful measure of our general wellbeing. For a couple of decades after World War II the proportion of useless and harmful activity must not have changed too much, because our material wellbeing did seem to rise roughly in proportion to the GDP. However lately the harmful side-effects of our activities have been increasing, and a rising GDP has not meant rising wellbeing for most people, as you may have noticed in your own life, as we have seen in Chapter 2, and as we will shortly see in other ways.

There are more sensible ways to measure national wellbeing. A first step is to use subtraction as well as addition, so good things are added, bad things are subtracted, and we arrive at some kind of *net* benefit of all our activity. This much ought to be elementary. Accountants would call it a profit and loss approach, or an income and expense approach. We can then go further. The dominant goal of governments ought not to be getting us to produce ever more stuff, the dominant goal ought to be to improve our quality of life. Measuring quality of life is not as simple as adding up financial transactions, but we can already do it surprisingly well, thanks to good work by some thoughtful people, as we will see shortly.

An example of the profit and loss approach is the Genuine Progress Indicator, shown in Table 8.1. The calculation is laid out as a balance sheet, good things listed in the credit column and bad things in the debit column. We don't need to be concerned with technicalities here, so I won't explain the exact meaning of all the terms.

Table 8.1. Australian Genuine Progress Indicator, 1996[67,68]

Credit		Debit	
(Personal consumption)	-260.90	Unemployment	19.76
(Income distribution index)	-107.87	Underemployment	2.02
		Overwork	10.09
Weighted personal consumption	281.43	Private defensive expenditure (health and education)	12.19
Public cons. expenditure (non-defensive)	25.35	Commuting	5.44
Household and community work	155.08	Noise pollution	2.40
Services of public capital	6.09	Transport accidents	5.01
Net capital growth	5.87	Industrial accidents	7.63
		Irrigation water use	0.64
		Urban water pollution	3.58
		Air pollution	9.42
		Land degradation	4.51
		Loss of native forests	4.81
		Depletion of energy resources	42.59
		Climate change	22.90
		Ozone depletion	0.00
		Crime	9.94
		Net foreign lending	21.10
Total Credit	473.82	Total Debit	184.03
Net (Credit *minus* Debit)	**289.79**		

(Amounts in billions of 1990 Australian dollars. Income distribution is an index used to adjust personal consumption.)

Basically the two big items in the credit column are our total spending on the things we like to have (Weighted personal income), and the value of our unpaid work (Household and community). In the debit column are such things as unemployment, accidents, pollution and land degradation. Whereas a car crash makes the GDP go *up*, a car crash makes the GPI go *down*.

Thus in contrast to the GDP, the GPI gives us what you and I regard as correct information, namely that accidents reduce our wellbeing. Even if no-one is injured in the car crash, the car has to be repaired or replaced, which uses time and money that could have been used for something else, so we are the poorer for the accident.

The GPI goes beyond the GDP in other ways, by including unpaid work and estimating costs of things like pollution and land degradation. Unpaid work includes volunteer service to the community and also some household activities that are seen as contributing to our total wellbeing, like caring for babies and growing vegetables. Unpaid work is a surprisingly large fraction of our total effort, about a third of total credits – or is that really surprising? Economists might be surprised, though many women will not be.

Now let's see what happens when we review a few decades of 'progress' using the GPI as a measure instead of the GDP. Australia's GDP and GPI are compared in Figure 8.1. The GDP went up about two and a half times between 1950 and 2000 whereas the GPI went up by only about half. Thus the GPI is telling us we are better off than in 1950, but not nearly as much as the GDP might lead us to believe.

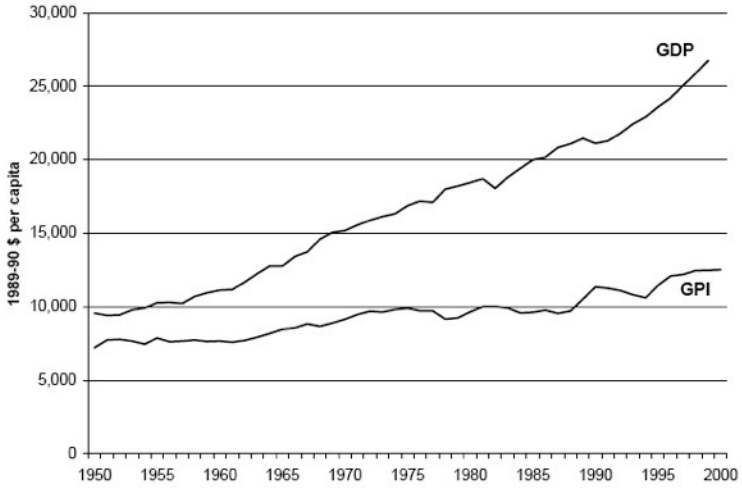


Figure 8.1. Australia's GDP and GPI *per capita*, 1989-90 $[68].

The divergence between the two is even more striking for the US, shown in Figure 8.2. In this case the GPI actually decreased from 1976 to 1993 and by 2000 still hadn't regained the value it lost over that period. Whereas the GDP claims Americans were about sixty percent better off in 2000 than they were in 1976, the GPI says they were worse off.

The message of the GPI seems more consistent with the fact, noted already in Chapter 2, that the median wage in the US didn't increased much, and for some groups it decreased. Between 1989, the year before an economic slump, and 1998, poor and middle class Americans' income and wealth declined. Real hourly wages stagnated or fell for the bottom 60% of workers. Median worker income was 3% lower. Median family income was no greater, despite couples working about six weeks more per year. The wealth of the typical middle class family declined by 3%, mainly because of higher debt.[69]

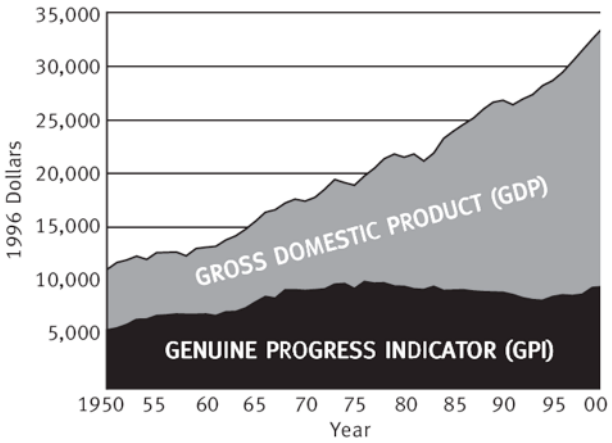


Figure 8.2. GDP and GPI *per capita* for the United States[70].

The GPI's message is also more consistent with the fact that there's a lot of poverty in the US, as was painfully evident after Hurricane Katrina devastated New Orleans and it was mostly the poor of that city who suffered and died. It may be less well known that there are about a two million homeless people in the US. About 800,000 of the homeless are children. Nearly a million of the homeless people actually have jobs, but the jobs pay so poorly the people can't afford housing. The US has given the world many things, and now among those gifts must be counted the *working homeless*. Thus the GDP might reflect the wellbeing of former Microsoft chairman Bill Gates and the Wall Street cowboys but the GPI seems to give a more realistic portrait of a nation's wellbeing, as we should expect.

The GPI is certainly not the last word on how to characterise our state of wellbeing, and its details are and should be vigorously debated. The GPI undoubtedly needs to be improved, and there are judgements required as to how to weight things in different categories, like growing vegetables and depleting natural resources. The GPI is nevertheless based on a defensible approach, of estimating income and costs and calculating the difference. The GDP, on the other hand, is not defensible at all as a measure of wellbeing. It was never intended as such and it plainly fails in that role.

An alternative approach to measuring wellbeing is called Triple Bottom Line, as it separately evaluates the economic, social and environmental areas. Advocates of this approach point out that it avoids the need to assign dollar values to things whose value is hard to price, such as a healthy forest, or has no price at all, such as the quality of a mother's love. In this approach, some of the things in the GPI might be reassigned to

other categories, or might appear in more than one category. Thus crime does involve financial costs that could be counted in the economic category, but it also indicates that a society is less cohesive and peaceful than it might be, so it would also appear in the social category, also as a negative. Similarly the loss of timber in a degraded forest would have an economic value, but a forest provides us with many other 'services' like clean water, better rainfall, a refuge for biodiversity, potential but undiscovered drugs and aesthetic and spiritual nurturing. Thus the health of a forest might be listed in appropriate ways in all three categories.

There will be no 'best' way to summarise the wellbeing of a whole society, and many other variations and elaborations are possible. In a sensible world, the Triple Bottom Line would be better than the GPI, because it gives us more complete information with fewer debatable assumptions about whether things have dollar values. However in the superficial and sensational world that passes for political discussion and reporting, politicians and media would rather reduce everything to a single number. Thus if the GPI were adopted as a primary measure we could expect it to be reported prominently, whereas a Triple Bottom Line might be relegated to page 6 of a newspaper, and might not appear at all in the info-tainment that TV executives are pleased to call 'news'. For the time being, if we're stuck with a single number, the GPI is of some use, whereas the GDP is highly misleading and we'd be much better off without it.

Using GDP to measure our wellbeing is not just a minor detail, it seriously distorts our society's priorities, as a couple of examples should illustrate. Consider the chemical company of our earlier example, producing $3 million worth of chemicals and $1 million worth of pollution in the process. Since the pollution reduces the GPI, a government anxious to keep the GPI increasing would have an immediate incentive to stop the chemical company from polluting. In the present situation, however, the $1 million cost of cleaning up the pollution is merely added into the GDP as 'activity', so the government has no incentive to stop the pollution, in fact the incentive is to allow the pollution to continue.

Similarly, unsustainable clear-cutting of Tasmanian forests would reduce the GPI but increase the GDP. You see how our crazy national accounting actually encourages governments to ignore over-exploitation of natural resources. In fact, since exploitation of resources and of people (through overwork and low wages) simultaneously increases corporate profits and the GDP, there is a clear incentive for an unholy alliance between unscrupulous corporations and unscrupulous or stupid governments.

What about the things GDP doesn't count? Marilyn Waring came up with the example of six mothers who stay at home caring for their babies[71]. Their loving care doesn't register with the GDP, because they are not paid for it, so their loving care has no value according to our national accounting. However if each mother were to hire the next to baby-sit her child, then money would change hands and the GDP would go up. Thus having someone else care for your baby is regarded as more valuable than caring for your own baby, in the sick world of our national accounting. Governments anxious to see the GDP rising have little incentive to encourage mothers to stay home and care for their

babies. However governments have a real incentive to see mothers out working, because then their paid work and their child care costs add to the GDP.

This kind of problem is even more important in poorer countries, in which much more activity may be at the local village scale and fail to register in the GDP. This means, on the one hand, that some such countries may not be quite the 'basket cases' some economists describe them as. On the other hand if people are displaced into cities to work for a pittance as land is taken over for cash cropping, then the people have to pay for things they formerly did for themselves, or obtained from the local village. Thus the shift from growing vegetables to buying fast food adds to the GDP and thus counts as progress, whereas it commonly represents a significant regression in the person's health and happiness, and in the health of the nation's social fabric.

We can now see that 'the economy is growing' carries a quite deceptive message. It doesn't mean what it seems to mean and it won't accomplish what it's supposed to accomplish. It doesn't mean our quality of life is improving. It doesn't even mean we're getting richer. It means we're busier. It means the dollar value of our paid activity is increasing, but it takes no account of whether that activity is useful, useless, harmful or attempting to repair some previous harm. It ignores unpaid activity and so undervalues or ignores and implicitly discourages many valuable things, including mothers' care of their children.

Even if we understand 'the economy is growing' to mean 'the GDP is increasing', unemployment and poverty will not be eliminated. They will, in the long run, still obstinately persist, as they have through decades of GDP growth. The factors controlling unemployment and poverty evidently must be found elsewhere.

I noted earlier that assessing the state of our finances involves two parts. First is a balance sheet of our current income and expenses, from which we can calculate a net income, as we have just done. The second part is to calculate our accumulated wealth and see if it is increasing or decreasing. A positive net income does not necessarily mean our wealth is increasing, because our wealth depends also on the value of any assets and liabilities we possess, and the values of assets can change. For example the price of housing has recently been falling in many countries, whereas the value of an oil reserve is increasing because the future supply of oil is believed to be limited.

Thus to measure our material wealth we have to count the worth of our current assets and liabilities, and subtract liabilities from assets. If our assets are greater than our liabilities then we have some wealth. If not then we're bankrupt. Politicians keep telling us we're getting richer, but they really don't know if that's true, because there is no balance sheet calculated for national assets and liabilities. The problem can be illustrated with a little parable about neighbouring farmers.

Farmer Brown and Farmer Charmer

Farmer Brown and Farmer Charmer run neighbouring dairy farms that are similar in area and fertility. Farmer Charmer drives a fancy car, owns all the latest electronic

gizmos and eats at the best restaurant in town, whereas Farmer Brown seems to be earning only a modest income. Farmer Brown wonders how Farmer Charmer can be doing so much better than he is. Then he hears the gossip in town that Farmer Charmer just sold off 30 of his 100 dairy cows. They also say he has borrowed a lot of money from the bank. He's supposed to be spending the borrowed money on farm improvements, but Farmer Brown knows no real improvements have been made on his neighbour's property.

It seems as though Farmer Charmer must be selling his cows to keep up his lifestyle. He might even be spending the loan on his lifestyle instead of on farm improvements. In this story this is true. By selling some of his cows, Farmer Charmer is reducing his ability to earn income. By not spending his loan the way he agreed to he is likely to get in trouble with the bank, which could sell his farm from under him in order to recover its money. Farmer Charmer is on the road to bankruptcy.

Countries are not managed as irresponsibly as farmer Charmer managed his farm, are they? Australia, since the mid-1990s, has been rated as one of the world's healthiest economies, with GDP growth rates in the 3-4% range, slowly declining unemployment and low inflation. It suffered few ill effects from the 1997 Asian currency meltdown, from the bursting of the American dot-com bubble in 2002 or from the GFC in 2008. Yet during those years Australia's private debt increased from about 85% to about 165% of GDP (Figure 8.3). That increase was actually a continuation of a trend that began in 1964, when debt was 25% of GDP, and since then the debt to GDP *ratio* has increased at a rate of about 4% per annum[72]. Private debt in Australia is now at *twice* the level, relative to the GDP, that ushered in the Great Depression, and much higher even than in the 1890s depression, which may actually have been a worse depression.

In 2007 the net *increase* in Australian's private debt amounted to nearly 20% of GDP. In other words nearly 20% of our alleged income was actually new borrowing. Without that borrowing the economy would have been in severe recession. Most of that borrowing has gone not into investment, which would give some hope of eventually paying down the debt, but into a speculative housing bubble[72]. Australia has been living like farmer Charmer.

One wonders how Australia's economic managers could let such a situation develop. A clue comes from comments by the deputy governor of the Reserve Bank, who conceded that borrowing was not yet showing any sign of finding its equilibrium level. Someone who can look at the forty-year record of exponential growth in Figure 8.3, the signature of instability, and imagine he is looking at a system that is approaching an equilibrium is rather clearly failing to recognise the nature of the beast in front of him. A second reason may be that mainstream economic models do not include money and debt, as already mentioned.

Figure 8.3. Ratio of private debt to GDP, Australia[72]

Yet the main reason evidently is that economists consider that debt doesn't matter because, they say, one person's debt is another person's asset. This claim ignores two things. First, that if I borrow money I can spend it and "stimulate" the economy. If I then pay back the loan I have to reduce my spending and thus de-stimulate the economy. It all balances out over time, but in the meantime there are imbalances. The second thing ignored is that the bank's "asset" is not a material and useful thing, like a tractor or a factory, it is only a promise. If the world does not go as we expect, I may default and the bank's asset will evaporate. There is a fundamental distinction among kinds of "assets" that is overlooked by economists' loose terminology.

At the same time as private debt has been increasing dramatically, the value of many of Australia's assets has been declining. Public infrastructure, like roads, public transport and schools are underfunded and deteriorating. Soil, fragile to begin with, is degrading and eroding. Inland rivers are widely acknowledged to have been in extremely poor condition after a decade-long drought and persistent over-allocation to irrigation. (The record rains of 2010-11 have given them a welcome reprieve, but the policies that degraded them remain in place.) If a proper national balance sheet of assets and liabilities were kept, we would be better able to judge whether the nation was actually getting wealthier, or just living off its assets and its credit card.

As well as monitoring the nation's wealth, the assets owned by the government on behalf of the people also need to be monitored, but this monitoring has also been highly deficient. Throughout the neoliberal era, publicly-owned assets have been sold and the proceeds counted as income, which was then used to help to balance the government's budget. This is yet another violation of elementary business and accounting practice. It is

using asset sales to maintain cash flows, just as farmer Charmer sold off his cows to increase his cash flow. It allows for lazy management by governments, so long as there is still some family silver that can be sold off. It also disguises the fact that most citizens have been made poorer by this process. The government does not own public assets, the public does, and as assets have been sold and the proceeds used for recurrent expenditure we all have lost wealth – unless we are among the wealthy minority that has gained private ownership of valuable assets, often at bargain prices.

One might might wonder why national accounting is so incomplete compared with business accounting. Turnbull[73] notes that in Adam Smith's time there was much less trading of private property, so there was little perceived need to track assets during the formative period of conventional economics. Neither was there much foreign investment. The world has changed a great deal in the two centuries since, which indicates that the general intellectual isolation of the economics discipline extends to isolation from the rigours of the real world of modern business. As well, the politicians and bureaucrats responsible for managing national economies are not answerable to any law in the way business managers are. In principle they are accountable to voters, but since they are also in control of most of the relevant information their accounting to their constituents is of a very crude and self-serving kind.

Balance sheets can also be developed for a country's natural environment. There are some moves to implement accounting of environmental stocks and flows, which are the environmental equivalent of assets and income. To the extent that this raises people's awareness of the state of the environment it may be useful.

However ultimately we cannot apply economic thinking to the natural environment. For example, the dollar value of a forest is not definable. We might count the value of its potential yield of lumber, and we might note what are called "ecological services" such as clean water, exchange of carbon dioxide for oxygen and so on, though it would be difficult to estimate their dollar value. But how do we know what medicinal compounds our descendants might find in the forest, and their potential value, and how to we value the forest's place in the regional ecosystem, when we may not recognise that it harbours keystone species whose loss would generate reverberating degradation through the ecosystem? The aesthetic, psychological and spiritual value of a forest have no dollar value. Also fundamentally, dollar values are only definable for things that can be exchanged for other things. Furthermore these valuations are all in terms of the forest's value to humans, but some people would say we cannot morally ignore the right of other species to exist. Underlying all other considerations is the fact that our existence is ultimately dependent on the biosphere, and if we kill the world's forests we kill ourselves.

The Australian Government produces an annual State of the Environment report which, perhaps wisely, restricts itself to estimating whether various parts of the environment have improved or declined, without attempting to attribute dollar values. This is an imperfect exercise, since only some of the factors just mentioned are considered, but it is commendable nevertheless, since it helps to keep the condition of the natural environment in the minds of our managers, however peripherally.

The way we count our national income and wealth is so deficient it can only be called bizarre. We put all our transactions in the credit column of the national ledger, add them up and claim our economy is thriving. The universal criterion for successful economic management is that this bogus tally of alleged credits (known as the GDP or just "the economy") is growing. We sell assets and count the proceeds as income without recording a reduction in our net wealth. We don't even calculate our net wealth, even in the financial terms that accountants deal in, so we can't tell if we're getting richer or poorer. Meanwhile politicians and economic managers strut and preen and commentators lose themselves in all the trifling detail without ever noticing they are participants in a farce.

Our accounting for our natural assets is even more deficient, because it has only recently occurred to us that we might need to do any such accounting. After several generations of economic growth in the rich nations we are using so much of the Earth's bounty that some resources are beginning to run low, the living world is degrading rapidly, and we are affecting the global climate in a way that threatens to be disastrous. In other words, we are living off our natural assets. However economists haven't noticed, because they haven't been doing the necessary accounting. Current economic polices, abetted by deranged accounting methods, would attempt to continue to increase our use of the Earth's resources indefinitely. However this kind of growth simply can't continue. We have to find a different way forward.

9. *Dividing the Pie*

Democracy itself will always be stunted by the exaggerated political power exercised by concentrated wealth. The problem is not that capital is privately owned, as Marx supposed. The problem is that most people don't own any. – William Greider[74]

In that simple statement Greider identifies a central source of pathology in modern capitalism, a pathology that has provoked severe and prolonged social conflict. Much of the destructive conflict of the past century grew out of the tension between owners and employees. That includes the communist revolutions and the consequent Cold War and nuclear confrontation, the major ideological division within the democracies, and the continuing contests within other societies between common people and ruling elites.

Greider's statement leads to an even more basic question. Because human beings are social, we do many things collectively. Indeed our complex modern societies link us all in many ways. Very little of what we do could be done without the rest of society functioning around us. So to what extent are our "individual" efforts really individual? How are the rewards of our individual-plus-collective effort to be shared?

The form that ownership takes may not usually be considered an issue in economics, but it is a crucial determinant of how an economy operates, as Greider's comment highlights. In fact ownership can take many forms, and many forms already exist, even in capitalist societies. With ownership comes not only rewards but also responsibilities. Different forms of ownership affect the distribution of rewards, and also whether responsibilities are properly and routinely discharged, or not.

The topic of ownership is fraught with ideological baggage that we would do well to move beyond. On our right is someone harrumphing that private property is the foundation of capitalism and of modern wealth. On our left is someone else proclaiming the need for public ownership, meaning ownership by the public through a government. Behind us is a social democrat saying "now let's be reasonable" and urging a mix of the two. However ahead of us is a smorgasbord of other options, each with its own implication for how rewards and responsibilities will flow.

To examine the range of ownership options and their implications we need to step back and think through a few basics. It will turn out that different forms of ownership may be appropriate for different situations. For example we need to think about whether an activity is routine production, or an expansion of productive capacity, or bringing an

innovation to market. We also need to think about how the value of land is affected by investment on the land itself *versus* investment in the neighbourhood of the land. We can also think about different forms of land tenure, short of outright ownership. With that context of options and implications established, we can look at existing forms of ownership and their effect on our economies, and at alternative forms that might be more beneficial.

In traditional small communities the sharing of the rewards of collective effort is determined by social customs that usually ensure that everyone has enough, even if some have more. In larger societies those social rules fail to operate, and the result historically has been that a few people claimed much of the reward, many people gained barely enough to survive on, and some didn't survive. That arrangement was dictated basically by force, or by the threat of force. In modern societies rewards flow mainly to those who own, as Greider implied. Ownership, in turn, is assigned to those who supply money, so rewards flow mainly to the wealthy. The result, as Greider lamented, is concentrated wealth and exaggerated political power. Does that distribution of rewards, from efforts that are necessarily substantially collective, reasonably reflect the contributions of those who have contributed?

Here we may be like fish struggling to become aware of the ocean they swim in. We are so used to one particular concept of ownership it is hard for us to realise it is just a social convention. There are traditional societies in which the concept of ownership does not even exist, and whose people find the idea difficult to grasp. The Earth is productive, and through their collective efforts they gain enough for themselves to live by. No-one can lay exclusive claim to the Earth, it is there independently of people. Our situation is not fundamentally different, but we do lay exclusive claims, and we have different rules in our larger societies for how the bounty is divided up.

Ownership is a foundational social convention upon which those rules are built. If you *own* something, it means you are allowed control of it, and any benefits from it flow to you. That is true whether you own a paddock, a cow or a media empire. However many forms of ownership are possible, total or partial, individual or collective, unrestricted or conditional. Moreover many forms of ownership are already widely used. The forms of ownership we choose have a great influence on the characters of our economies and societies.

With ownership usually comes responsibility. You should ensure that your cow does not eat your neighbour's vegetable patch. You should ensure that your chemical factory does not poison the river. Since you have sole control, you also bear responsibility. However large societies present many opportunities to avoid responsibility. You can survive for a long time in a large society by selling shonky goods to people you will never see again, but you could not do that in a village. We have many laws and regulations to try to hold people responsible, but it is always a competition between those seeking to avoid regulations and those seeking to revise and enforce regulations. Lately the avoiders have been doing better than usual.

If we want a fair and functional society, we need to ensure all those who contribute to collective efforts receive appropriate rewards and bear appropriate responsibility. Because ownership is so important to how both rewards and responsibility are shared around our society, we must look particularly at the role of those with the designation "owner". However many others, apart from owners, may contribute to an enterprise, so we should also consider the flow of rewards and responsibility more generally.

In our society ownership is usually acquired by buying, and buying (part of) a productive enterprise is usually called investment. The discussion of this chapter would more usually be placed under a heading "Investment and Ownership". By focussing on rewards, and their complementary responsibility, we are drawn deeper into the relationship between the economy and society. Investment will also be discussed in a later chapter, in the context of the supply of money, with which it is deeply and dysfunctionally entangled. Thus we begin here to draw out the close interconnections among ownership, investment, money, the economy and society. This is a concern that will recur.

Because we have to carefully disentangle some closely related ideas and a fair bit of misunderstanding and confusion, I will resort to using subheadings. These are signposts that help to keep track of where the discussion has been and where it is going.

Essence of investment

It will clarify much of the enquiry to follow if we look at a simple and basic example of investment. Investment is usually thought of in terms of buying, with money. However it need not involve money. In common parlance we may speak of an investment of effort, but in economics and finance it is usual to think in the narrower terms of purchasing with money. There is much confusion about the nature and ramifications of money, as we will see in later chapters, and those who supply money to a collective enterprise often are granted the privileged status of "owner". Therefore it is instructive to look at investment without the complications involved with money. To do so I will use a little parable.

A Trad Marriage

> In the village of Trad, two young people are about to be married and the village decides a new house is required for them. If the materials for a new house are available in their local environment, and if the villagers have a sufficient supply of food, either stored or also available in their environment, then the villagers may take a few days to collectively build the house. Trad would then have a new asset. Suppose the villagers decide also to establish a new field for the young couple to work, and they take a few days to do that. Trad would then have some additional productive capacity.

In this little story we can see an investment process in pure form, without any entanglement with the potential confusions arising from the use of money. The essence of the villagers' investment process is that they have some surplus capacity, in the form of available food, which they combine with their resources (able-bodied people, and materials available in their environment) to generate a new asset and some new

productive capacity. Surplus is converted into new productive capacity. If the villagers had no surplus of food, they would not have been able to take the time to create the house and the field.

Notice that because there is no money involved in Trad's investment, there is no debt. No-one had to take out a loan, or agree to a specific return of goods or services. To be sure, there will be some expectation on the young couple to return favours, but in many traditional societies this is commonly a generalised obligation to participate in the village's collective activities. People are social beings, and we have strong innate tendencies to cooperate within our community, and to ensure that others also cooperate. Here however there is no explicit expectation or contract that the couple will return so much food and so many person-hours of their labour to the village. Nor is there an expectation for them to return *more* than they were given.

Notice also that if it should turn out that the new field has sour soil and things won't grow well in it, then village life won't stop. (It's unlikely real villagers would be so ignorant as to choose such a poor piece of ground, but this is only a story.) Trad's productive capacity will return to what it was before, and the couple's needs will have to be met some other way. Trad's investment will not have yielded anything, but that is the end of it, there are no other repercussions. Contrast this with what happened when some of Wall Street's investments went bad: the global economic system was threatened with collapse. As Americans put it, when Wall Street went bad, so did Main Street. We will see later what it is about the way Wall Street operates that leads to such different results.

Forms of ownership

So now to enquire into forms of ownership. You might own a farm, and your tenure would commonly be called freehold. On the other hand you might own the right to graze a piece of land without owning the land, and your tenure might be called leasehold. In a different kind of example, you might own only a piece or *share* of an enterprise, rather than a whole enterprise. Such shared ownership might come with conditions, or it might be granted privileges, such as limited liability. In pre-Civil War America, the granting of limited liability often involved explicit restrictions, such as limits on capitalisation or the duration of incorporation. You might own a block of flats and the land it occupies, and you can then collect rents from the flats for as long as you own them. On the other hand you might build a toll road at your own expense but own only the right to collect tolls over a twenty-year period, after which full ownership passes to the state.

Thus although ownership is a simple concept, the flexibility with which it can be applied allows us to have a great deal of discretion over the flows of rewards and responsibilities. Creative variations of ownership will be encountered through this and later chapters as we examine how we might create more stable, more durable and fairer economies.

Discussion of the ways in which rewards and responsibilities flow in our society is complicated not only because there is a variety of existing ownership arrangements but also because the subject is entangled with ideologies. Thus neoliberals may insist that

working for a wage is just another market transaction and the 'labour market' should rule. On the other hand Marxists might argue that the labour theory of value applies, and that goods have no value other than that created by the labour of the workers. Neoliberals might be dismayed to learn that their putative hero Adam Smith had something different to say on the subject. However Marxists should take no comfort, because neither did he support the labour theory of value in its simplest form.

Smith noted that when collective effort is involved there is no objective way to separate the relative contributions of bosses, workers and machines. It is thus a social choice as to how the rewards are apportioned. Smith concluded that wages are determined not by market forces but by the bargaining power of the employee. Even more dismayingly, Smith argued that the relative bargaining power of employers and employees was strongly influenced by laws the government passed and that, as a rule, the government sided with employers against employees[75].

Contributions, rewards, responsibilities

The rewards we are considering come from "economic activity", the production of wealth, but it is helpful to distinguish among different contexts. Some wealth production comes from routine activity. It is just people making their livings in the usual way. Some wealth production comes from expanding our productive capacity, in other words from doing more of what we usually do. Finally some wealth production comes from innovation, from finding new and more productive ways to do things. Thus there is routine activity, there is growth, and there is innovation. The way rewards flow may be different for each category, because different inputs are required in the different categories.

It will be sensible and healthy for us to remember also, as a context for this enquiry, that much of the wealth we acquire is harvested or extracted, not created by us. We may create clever means of harvesting or extracting, or we may create clever devices from what we gather, but some part of the wealth is provided to us by the bountiful Earth. This simple underlying truth is obscured by the neoclassical jargon of production and consumption, as though farmers, not plants and animals, produce food, and as though we eat televisions.

Routine activity

At any given time most wealth results from people going about their routine activities, whether ploughing a field, running a grocery checkout or working on an electronic assembly line. For the self-employed the social contract is fairly straightforward. The rewards from their efforts flow to them. Their responsibilities are to observe the laws and to pay taxes. The taxes pay for services provided to the business by society, such as physical infrastructure and legal systems. Taxes also pay for collectively-agreed obligations, such as ensuring the less fortunate are cared for.

When an enterprise requires many people, a typical arrangement is that there are owners, management and workers. Typically workers get the least reward, management gets more and owners get the most. Some of these differences usually reflect different levels of skill or responsibility. Thus a skilled worker, a trained accountant or a manager

responsible for million-dollar turnovers are paid more. However some of the differences in reward reflect an imbalance of power between owners and employees. Owners have wide discretion over what happens in the business and employees do not. Owners determine, ultimately, who works there and who does not. Managers have more power than workers because some of the owner's power is delegated to them. The imbalance of power is manifest when conscientious employees can barely make a living, even though the firm they work for is prosperous. Walmart, the world's biggest retailer, owned by some of the world's richest people, is notorious for paying so little many of its US employees are eligible for welfare.

The imbalance of power can be highlighted by contrasting the common employer-employee arrangement with a cooperative, jointly owned by all participants. In that case no individual has anything approaching the power that a sole proprietor has. The power imbalance between owners and employees has led the liberal democracies to legislate minimum wages and requirements for minimum safety and fairness. However there may be more effective ways of ensuring fairness, as the mention of cooperatives might already suggest.

Expanding productive capacity

The next context to consider, after routine activity, is expanding activity or growth. If we want to increase productive capacity then other factors come into play. To clear a new field for cultivation or build a new factory requires investment. In the example of the village of Trad we saw that the basic investment is of human effort, and that requires some availability of resources, either in the environment or stored, so people can devote effort to creating new productive capacity rather than to just getting their next meal. In modern economies, stored resources are commonly made available through the medium of money. However we have seen in the example of Trad that money is not essential. This is also true in contemporary Amish communities in the US, in which neighbours gather for a barn-raising, making a gift of their labour. If the lumber for the barn were locally grown and cut, little money may have been involved, but a farm will have been made more productive. Thus a store of resources is essential to creating new productive capacity, and that may or may not involve money.

When money is involved in investment, as it usually is in our society, the investor certainly has rights to some benefits. Anyone who invests savings in an enterprise deserves a proportion of profits, because they could have used their savings for some other profitable activity. They should also be required to bear a share of risk. However our present financial system tends to maximise benefit and minimise risk for investors. For example it exaggerates the power, and profit, of shareholders by permitting extremely short-term "investment", thereby facilitating parasitic speculation. It also ensures that the most exploitative firms world-wide set the level of returns expected by everyone, and that level of return will be disproportionate in most other, less exploitative, enterprises. If the financial system were stabilised and reduced in its power, as discussed in Chapter 7, perhaps through an appropriate transaction tax, speculation would be limited and investment would be more loyal and committed. Profits for shareholders would then be more in proportion to investors' input.

A separate issue, that we will look at in a later chapter, is that much of the money banks "loan" for investments is not savings, it is new money created out of nothing. Banks should therefore be paid only for the service of providing currency, because they are not investing saved resources and cannot therefore claim a return as though they are genuine investors.

Innovation

We have looked at routine activity and at the expansion of productive capacity. Innovation is the third situation to consider. The story of human progress has been a story of combining leisure, enabled by a surplus of resources, with inventiveness to create more efficient ways of making a living. This is as true of inventing a stone axe as it is of developing a new electronic device. This suggests it is a confluence of surplus resources and inventiveness that leads to innovation in a modern economy. I will use the term "innovation" here to mean making production more efficient or producing a more useful or desired product. Economists would call it improving productivity, the amount accomplished by a given investment of effort. Thus innovation might involve the invention of a new physical technology, but it might also involve a new social technology, to use Beinhocker's term.

Let's dissect innovation a little further. To bring an innovation successfully to market requires knowledge, effort and, if more than one person is needed, leadership. So perhaps it is the *confluence of knowledge, leadership, effort, leisure, physical resources (if required) and (possibly) money* that generates innovation. "Leisure" is included in the sense that people are free to devote their time and effort to innovation rather than to the routine of making a living. Of these, knowledge, leadership, effort and leisure are essential. Physical resources may be essential for a physical technology. Lacking any one of these inputs, no new productive capacity will be created. Money may be a very useful way to provide the required "leisure", but in this view it is the only factor that is not essential.

This is not to argue that money plays no role in creating new wealth, but to note again that money is not essential. Money may facilitate and accelerate the process, and therefore be a significant factor, but it is only one of several factors, and not obviously the dominant one. We are right to ponder, then, why rewards seem to flow predominantly to the providers of money, rather than more proportionately to all those others involved. The question is rendered more urgent by the fact that money, as currently mismanaged, very often magnifies instability and risk, as we have seen already in financial markets and we will see more generally in the later discussions of money.

How should the rewards of innovation flow to the several parties involved? An inventor can often reap rewards from new physical technology through a patent, though global patenting of an important technology can be an expensive and uncertain process. Those who lead groups usually get a greater proportion of the rewards. A certain premium for leadership is appropriate, particularly if the innovation is a social one, though there is no equivalent of a patent for a social innovation. Those who contribute their effort ("workers" in the old jargon) deserve a decent reward for their essential contribution, particularly if they are required to retrain or reskill. Investors, meaning suppliers of saved money, can rightfully expect a return to compensate for foregoing other

profitable use of their savings. They might also reasonably claim a higher return as a risk premium because innovation involves more risk than just an expansion of capacity. Beyond that their role is as previously described, namely as a facilitating but non-essential contribution, and they should not claim a dominant share of the rewards.

Social choices

How rewards are shared among the various parties involved in the different contexts we have just looked at will remain to be determined by participants, with society working to ensure that systemic biases are minimised. As Adam Smith observed, the choice is a social one. However we can be alert in the future to many biases that have been obscured or disputed in the past, especially the bias to channel excessive rewards to absentee owners. As indicated already, society can promote other forms of ownership that remove some of the big biases, especially the one described by Greider in the opening quotation. Later we will look at a couple of the major variations.

Valuing land

The ownership of land and rewards flowing from land raise further considerations. The topic is mired in confusion and controversy. Practical difficulties have occurred, for example, because land prices tend to rise relentlessly, a factor underlying the sub-prime mortgage bubble that led to the Global Financial Crisis. Part of the confusion might arise because economic concepts have barely progressed beyond a pre-industrial world view: economists often speak of "land, labour and capital" as "factors of production", as if we are discussing a feudal estate. Controversy has arisen as some people have tried to introduce more appropriate concepts into economic discussion. There are important distinctions to be made here that are easily lost in heated debates, and the modern concept of *emergence* helps to clarify the topic.

Agricultural land

In the agricultural context, the question of who keeps the reward from land is easier to deal with, though not entirely without complication. Broadly it would be agreed that the person who cultivates the land ought to reap the reward. In the case in which the cultivator is the owner of the land, this is straightforward, though we should still remember there are responsibilities, so the community might feel entitled to ensure the land is not degraded by poor practices, and neighbours might reasonably expect pests to be kept to a minimum.

The case of a tenant farmer is not so straightforward. Our conventional resolution is that the tenant farmer pays a rent to the owner. However what might constitute a fair rent is not necessarily obvious, as Adam Smith observed. We might ask how ownership was established. In much of Europe traditional ownership was claimed by local lords through the feudal system, but that ownership was established by force over a thousand years ago. The English Anglo-Saxon experience was of a brutal subjugation after the Norman conquest, which was a relatively late phase of the feudalisation of Europe. This followed the pattern of empires through history - the conquered, and the long-suffering peasantry, paid rents, taxes and tithes to the dominant power. In modern times, rich families may

gain ownership of land through influence with governments, or through outright corruption. In modern villages, the poor may lose ownership to loan sharks through a misfortune such as illness that they cannot recover from.

We might apply the logic we used earlier for investment in normal economic activity. The rewards result from the effort of the tenant farmer and the land provided by the owner. The owner would be due a modest rent because he foregoes the opportunity to gain his own reward more directly by working the land himself. If the owner shares the risk as well as the reward, this may be a reasonable arrangement. However if the owner expects a reward regardless of the season, pests, or the health of the tenant, then that is an unjust arrangement, and also one that constitutes a market failure because the cost of risk is not properly factored into the owner's side of the deal.

Thus even in the agricultural context there are non-trivial questions involved in deciding how the rewards from land might be distributed. In an urban or industrial context another layer of complication is added.

Urban land, emergent wealth

Turning to the value of urban residential property, there is a key distinction that is often overlooked or ignored. The value of urban land can increase for two distinct reasons. One is improvements to the property, such as construction of a dwelling. The other is improvements to the neighbourhood, such as additional shops, transportation, employment, schools, hospitals or recreational facilities. This second source of value accrues to the owner of the land, independently of any investment the owner makes in the land. There are thus two components of wealth, an internal component due to investment by the owner, and an external component due to investment by others in nearby businesses, services and infrastructure. The increase in value due to external investments gives rise to a windfall profit for the property owner. (Property values also increase because of speculative bubbles, but this is a separate mechanism due to a market malfunction. The external component exists independently of speculative bubbles.)

The externally-derived increases in value that comprise such windfall profits do not rightfully belong to any individual, because they arise from the mutual proximity of the individual properties that make up the community. Thus the value of a residence is increased by the proximity of shops, transportation and employment, the value of a business is increased by the proximity of customers, potential employees, related businesses and transportation, and the value of a transportation system is increased by the proximity of customers wanting transport. In the language of systems theory, the externally-derived value is an emergent property of a community. Since it depends on the existence of the community, it really belongs to the community. It is a major component of modern urban wealth, and it deserves a name. We can call it *emergent community wealth*. (There is at least one older term, which I will avoid for the time being because its meaning is not self-evident and it seems to carry undeserved disrepute.)

Some accrued external value may be recovered by the community if, for example, land taxes cover some or all of the cost of infrastructure like roads and water. However if infrastructure is added later the rise in value may result in windfall profits. In either case it is still important to recognise the value accruing from infrastructure as having a source

external to the land, as distinct from value arising from internal investments in the land. Thus infrastructure also contributes to emergent community wealth.

Because much urban land is owned by absentee owners, including large businesses and corporations whose owners may be anywhere in the world, some of the emergent wealth is lost to the community. Another component is captured by developers, who use the windfall profit from emergent wealth in one property to finance their next construction. Developers may be local or absentee, but in any case their profits are devoted to their own purposes and not to those of the community.

Some alternative forms of ownership and their effects

Now let us examine some alternative forms of ownership, and how they might redirect the flow of wealth. Shann Turnbull[76] has proposed some creative adaptations of existing contract and ownership arrangements that would enable a community to capture and retain its emergent wealth. He proposes separate titles to the land and the improvements, such as dwellings. The external value, the emergent wealth, would accrue to the land, and the land would be held by a Community Land Bank. Residents would receive shares in the CLB in proportion to the area of dwelling floorspace they owned. Absentee landlords and nonresident entities such as businesses and public agencies would not be entitled to any shares in the CLB, and thus would not own land, though they would be granted the use of it. In this way the emergent wealth of the community would accrue to the CLB and through it to the residents.

The equity thus gained by the CLB could be used to finance public infrastructure. Turnbull quotes the example of a new underground train line built in London in 1999. The cost of the line was £3.5 billion, but the emergent value accruing to properties within one kilometer of stations on the line was estimated to be £13 billion. The emergent value could have been used as collateral to borrow the cost of the project, which would thereby have been self-financing, requiring no input of government revenue. The net emergent value of £9.5 billion would have accrued to residents in the communities instead of to a few developers and landlords. The effect of conventional financing by taxpayers, on the other hand, is to transfer emergent public wealth to a few private entities.

A further innovation proposed by Turnbull would be for developers' ownership to transfer progressively to the CLB and residents over the period in which the investment is depreciated for tax purposes. Such arrangements are used, for example, in Build, Own, Operate and Transfer (BOOT) infrastructure projects such as toll roads. The idea is that the investor garners the profit from operating the infrastructure for, say, 25 years, after which ownership transfers to the relevant government entity. The same principle could be applied to building a block of flats. In that case ownership of a flat would progressively transfer from the developer to a renter. Ownership of the land would be vested in the CLB, but the tenant would be progressively granted shares in the CLB in proportion to the fraction of the flat owned by the tenant. At the end of the contract period (say 25 years), the tenant would own the flat and the associated shares in the CLB.

Although developers would not have access to windfall profits from emergent wealth, which would be retained by a CLB, such investments could still be attractive because a developer would avoid the cost of purchasing the land, which is commonly comparable to the cost of a dwelling. Investors would consider such an investment viable because the depreciation period is the period over which expected income from the asset will ensure a profit. Of course a developer might also choose to sell immediately to any resident able to purchase the flat at the outset.

For residents unable to purchase immediately, such an arrangement would allow them to become eventual owners for no more outlay than a normal rent. This would overcome the common problem that renters just pour money down a hole and never have anything to show for it. It would make a big difference to the lives of the poor, because they would be on an up escalator, actually accruing wealth. (If it seems like they would be getting a free ride, we should remind ourselves that wealthy rentiers ride up escalators all the time, leaving many of the rest of us trying to scramble up the down escalator.) Their wealth would come from two sources, the progressively increasing ownership of their dwelling, and their ownership of the associated shares in the CLB. The latter would be capturing the emergent wealth of the community, so their net worth would increase as the community increased in value.

Another concept developed by Turnbull is *surplus profits*[73]. Surplus profits are defined as those that accrue after the budgeted or depreciation period, over which a project is expected to return a viable profit. Any profits that continue to flow thereafter are icing on the cake. They are good for the contractor to have, but not necessary for the viability of a project. They are therefore a form of market failure, because price should reflect costs plus a reasonable margin of profit. Turnbull points out that transferring ownership under a time-limited BOOT-type of arrangement ensures that surplus profits accrue to the community and not to outside contractors or investors.

Corporations - one kind of collective ownership

Corporations have become the dominant form of collective ownership. Indeed they are the dominant form of ownership of all kinds. We therefore need to examine their effects on the flows of rewards and responsibilities. For society to be healthy, power must be exercised responsibly. Large corporations are so large that their managers and owners may have little idea of the disadvantage or harm their decisions might cause. Our financial system compounds the problem, because much ownership is exercised through giant investment funds and people may not even know what they own from day to day. Thus little responsibility can be exercised, even if there is a will to exercise it.

It is fundamental to a market system that producers pay the full costs of production, so that price signals are accurate and effort is apportioned effectively. It is fundamental to ethical and moral behaviour that we take responsibility for the consequences of our actions. Both of these connections are weakened or broken in our free-market capitalist society.

Corporations go back at least to the sixteenth century in Britain. They were conceived as a way to relieve ship owners of some of the high risks of maritime trade. Corporate charters were granted by the King, and were essentially contracts between society, in the person of the King, and a syndicate of owners. A key provision of the contract was to limit liability of syndicate members for debts of the corporation to the amounts they had invested. Since this required society to bear any loss beyond the amounts invested, it was agreed that society should have a share of any profits forthcoming. Thus the contract granted a privilege in return for an obligation.

The history of corporations in the United States of America is illuminating. The American Revolution was not just a rebellion against the King's authority, it was a revolution to create the first modern democratic republic. Thus it was a rebellion against concentrations of wealth and power in general. In the early decades of the Republic corporate charters were granted by the states, and they commonly carried specific limitations on such things as the life of the corporation or its maximum capitalisation. These limitations were intended to prevent corporations from becoming foci of wealth, and hence of power, that would intrude on the sovereignty of the people. Americans were alert to the fact that the lives of corporations have no natural limit, so they might continue indefinitely to acquire wealth and power without limit.

Corporations contested such restrictions from the beginning, and as their wealth and power grew, especially during the civil war, they gained influence. One of their arguments was that they should be treated as "natural persons", as distinct from their standing as individual entities or "artificial persons" that could engage in commerce and legal agreements but could not claim the citizenship rights of a person. It is claimed that in 1886 the Supreme Court ruled that corporations have the rights of natural persons, though it seems no such decision was ever made[77]. Nevertheless thereafter an increasing number of judicial decisions granted corporations rights of real people. Given the dramatically increasing power that corporations wielded through twentieth century America, one may view that event as a counter-revolution marking the end of the first American Republic and the institution of a plutocracy, rule by wealth[1].

Recently the US Supreme Court has again ruled on the power of corporations, this time striking down most limitations on corporate financing of political candidates. Only the most blatant bribery of politicians is now considered illegal. This ruling was made on the basis that corporations are "natural persons" protected by the Bill of Rights, including full rights to free speech. This is such a triumph of corporate power over the remnants of American democracy that, if it remains unchallenged, perhaps we should consider it as marking the formal end of the Second American Republic. That end was initiated by the frontal attack on democratic rights and institutions mounted by the administration of George W. Bush. The Third Republic, should it persist, will be undiluted plutocracy.

Corporations have gained many privileges beyond the limitation of liability. There is a large body of law specifically regarding corporations, much of it favourable to their operations, such as the law requiring corporate officers to maximise shareholder profits above all other considerations, or the tax-deductibility of interest payments on debt. When a large financial corporation gets into difficulties it is often bailed out by

governments, using tax-payers' money, on the grounds it is too important to fail. This often means corporate officers' recklessness goes unpunished either by market discipline or by any civil or criminal penalty.

Corporations' influence has culminated in neoliberal regimes that have systematically removed many restrictions on their operations and facilitated the wholesale offloading of costs and risks, through such practices as downsizing and outsourcing and by being able to pollute and over-exploit natural resources with reduced risk of being held to account by servile governments. Especially as corporations have become transnational they have increasingly avoided taxes, so that corporate taxes as a proportion of total taxes have fallen dramatically. Thus corporations have gained more and more privilege and have progressively shed responsibilities, to the point that they have been described as *organised irresponsibility*[78].

Corporations are granted large indirect benefits by the societies they exploit. A trusting society is necessary for businesses to operate. A coherent society is necessary to enact and enforce the laws on which corporations depend. Among those laws are property rights, criminal law and such enforcement of fair competition as governments choose to undertake. To the extent that exploitation of people and the environment undermine society, exploitive corporations undermine their own existence.

The contract between corporations and society urgently needs rebalancing. They must be required to pay a fair share of the cost of maintaining a functioning society, including legal and police systems. They should refrain from exploitation. Their privileges should be confined to those close to the original purpose, which was to spread some of the risks of doing business so long as there was a net benefit to society.

The criterion for the granting and continuance of a corporate charter should be that it is in the interest of society. The ultimate judgement of that must be in the political domain. There needs to be a willingness to retrieve corporate oversight from arcane legal systems and bring it into the light of day where it can be evaluated.

We should reflect that corporations, like governments, are creations of society. They have no innate right to exist. The people therefore have ultimate sovereignty over corporations, as they have sovereignty over governments, regardless of whether the people choose to assert that sovereignty. We are foolish indeed if we let these artificial entities exercise such power over us.

Alternative kinds of collective ownership

Corporations are not the only possible form of collective ownership. Indeed important alternatives already exist. In the 1950s in America, the investment banker Louis O. Kelso invented the employee-ownership trust to allow employees to purchase their company[79]. In the United States such trusts are known as ESOPs, or "employee stock ownership plans". Largely due the efforts of Kelso and his followers, about fifteen hundred American businesses now have majority ownership by employees through such trusts. Prominent examples are United Airlines and the Avis car rental company. Many others have lesser degrees of employee ownership[74]. The number is still only a small proportion of all firms,

but the feasibility of employee ownership cannot be questioned - it exists in the heartland of capitalism.

It has been a widespread practice in Japan to offer a share of ownership to employees, and is an integral part of an understanding of mutual interest between employers and employees. Employees are encouraged by this structure and by explicit incentives to offer suggestions and to try new ways of working. Such inclusive attitudes on the part of management played a large role in the dramatic rise in the efficiency and quality of Japanese industry during the latter half of the twentieth century.

If employees own the company, then if they have a problem with how much they're paid, or with workplace safety, or with how the company is run, they have the power to fix it. If owners have a problem with how much employees are paid, or with how hard they work, and the owners are also the employees, then it's their own problem. Owner-workers have to find their own balances among levels of pay, safety and maintenance costs, investment in the company's future, and so on. Those companies that cannot find workable balances do not survive. It is nobody else's problem. Strikes and lockouts are gone, the government does not need to adjudicate disputes, and its workplace regulation can be simplified to ensure basic standards.

A likely reaction to such thoughts is that it could never work. However there are already many forms of employee ownership, even in the modern homeland of capitalism, the United States. It might be said that employees would not be capable of dealing with the tough decisions required to run a company. Certainly there would be difficulties of transition for a newly employee-owned company. An employee-owned company might also need to be innovative with its governance structure. Moreover United Airlines is owned by a syndicate of its pilots, admittedly not the entirety of its workforce but it still embodies the alleged deficiencies of employee-ownership. It proves the viability of the model in a major corporation. Another outstanding example is in the Basque country of Spain, where a network of cooperatives has been thriving for decades, turning over several billion dollars a year.

It might be said the economy would stagnate because the engine of capitalism is the capitalist's vision, ambition and control. However most large companies are collectively owned, and run by a professional management class, not by the owners. As well, small firms tend to be more innovative than large firms, and the large firms acquire innovations by buying the small firms. Finally most modern enterprise is financed by debt, not by accumulated capital. The claim that the economy would stagnate under distributed ownership is thus simplistic and self-serving. There is still plenty of scope for creative and ambitious people under other forms of ownership, as publicly-owned corporations themselves demonstrate.

Ownership can be distributed beyond employees to other interested parties, or "stakeholders" in the ugly modern jargon. If a local factory is venting poisonous gases across the town and polluting the local water supply, and if townsfolk share ownership with employees, who are likely to be townsfolk themselves, then they can take direct action to fix the problem. Nevertheless the government may still choose to retain an interest in pollution in order to protect children and other innocent parties.

If suppliers feel they are being underpaid, unduly pressured by timelines, or threatened with arbitrary cut off, and they are brought into the governance of a company, then they have access to redressing their concerns. If Walmart's suppliers had a share of ownership they could end the exploitive stranglehold that Walmart exercises over them. Of course Walmart might not prosper quite as much if it ceased to exploit its suppliers and employees, but the fundamental market principle that producers pay full costs would be better served.

More localised ownership, such as in these examples, is obviously not compatible with globe-straddling transnational corporations with assets of $100 billion and offices in 100 countries. However as sensible reforms of the financial, trade and monetary systems are implemented, these ungainly creatures will tend to disintegrate into smaller and more efficient units. This is because a lot of their success is founded on their ability to take advantage of the financial disparities between nations, the power to hold peoples and nations to ransom, the power to enforce low wages and extract concessions and thus keep production costs to a minimum, the power to find a world market for the resultant goods at a selling price that disguises the cumbersome inefficiency of their operations and covers the wastage of transport, and the power to externalise and deflect many of the widespread social, employment and environmental consequences of their activities.[14] Better measures of costs and benefits would more clearly reveal the costs imposed by giant corporations, and the greater benefits to be had from smaller entities. Laws against size and monopoly are not a useful mechanism for reducing corporate giantism. Much the better approach is to address the feedbacks that lead to giantism, through the kind of reforms just mentioned.

Rewards, responsibility, ownership, investment and money are closely interrelated. The discussion so far has aimed to clarify the first four, and to open up possibilities. More aspects and possibilities will be examined in later chapters. There is great scope for creative adaptation of the rules that govern ownership, investment and money to create a fairer, kinder, more stable and more durable society.

Part 4: Money: Blindness, Folly, Instability

It may not seem credible to claim that money is very poorly understood in conventional economics. Alas, evidently there was until recently not even a theory that could account for how an entrepreneur could borrow money and use it to make a profit. Worse, money, and its close relative debt, are excluded from the vast majority of theoretical models of the economy. The basic nature of money, and its roles and purposes, are areas of great confusion. This allows major dysfunctions to go unrecognised or untreated.

There is a fringe literature on money that throws a lot of light on the subject. The ideas can be developed further, especially the implications for the overall behaviour of the economy. In these respects we can go beyond conventional economics, though the material obviously belongs within the study of economies.

Thus we begin with a look at the basic function and nature of money. We can then look at how money has been misused and abused. Money is inseparable from debt, so the role of debt is intimately involved. Because debt arises in our system mainly through "investment" we must consider how investment can be made more secure. Finally we can look at forms of money that would not be so prone to malfunctions and abuses as our present form of money.

10. Split Barter

You would think that because neoliberalism is so materialistic, because money is so essential to the functioning of modern economies, and because the financial sector has become so dominant, a clear understanding of the nature of money and the way it influences the economy would have been developed long ago. However it is a topic of great confusion and no clear theory. Several reasons for this situation can be conjectured. Perhaps it is because the banking system, that supplies money, grew out of the practices of medieval money changers, and not all of those practices are sensible, or reputable. Or perhaps it is because the static world of the neoclassical theory cannot really accommodate essential properties of money.

Not only is there a lack of understanding of our present monetary system, but the possibility of alternatives seems to be a taboo topic, causing economists quickly to change the subject, perhaps with a vague reference to disreputable populist agitators of the thirties. Evidently even to mention the-topic-that-shall-not-be-named could imperil one's professional credibility. So the possibility that alternative rules for issuing, paying for and regulating money could be of great benefit to society seems never to be even hinted at. However I am a scientist who has never been house trained, to borrow Paul Krugman's description of his relationship to Washington politics[80], so I have no such inhibition.

Evidently the exclusion of money and debt from their models has left most economists unable to grasp something virtually every adult knows: if people can borrow money they can spend it, and thereby "stimulate" the economy. Conversely if people are paying down their debt the economy will slow. Instead, economists assert that debt has no influence on the economy because "one person's debt is another person's asset". In the barter economy of neoclassical theory this might be true. However in the real world it is not, for the perhaps surprising reason that when you get a loan from a bank much of the money is created out of nothing. How this all works will be explained in due course. However it seems to have been this blindness that allowed the Global Financial Crisis to take so many economists by surprise, and that makes the current stagnation apparently deeply mysterious to the economics establishment.

The cause of the Global Financial Crisis was the accumulation of too much debt. Financial market "instruments" reportedly built up around $600 trillion worth of debt[81], which is more than ten times the annual "gross global product", an absurd and insupportable amount of debt. Most of the money we use also involves debt, as we will shortly see. Though we may be used to thinking of money as wealth, it is only a token for

wealth, a promise of some wealth (unless the society you live in uses pigs or tobacco for money).

Debt of any kind is, in effect, a bet on how the future will unfold. If food transport systems don't collapse, you will be able to redeem your $10 note for some food at the supermarket. If they did collapse, your piece of paper might be worthless. Many people made many very stupid bets on home mortgages in the US, and their pieces of paper became effectively worthless, so the economy foundered.

Although economists spend a lot of time talking about money, they do not seem to be clear about what money is, and even about how much money there is, because they have several different measures of the money supply (M1, M2 … M4). As already noted, in their central economic computer models exchange is treated as though it were barter and they include neither money nor any other kind debt. Their models therefore are not capable of replicating the GFC, let alone predicting it. The models cannot address a central feature of our economy, so in yet another respect mainstream economics cannot provide any insight into how the economy works.

To properly understand the behaviour of economies we must properly understand the roles of money and debt. We can say, in fact, that money is one of the most powerful agents in a modern economy. This is not a new claim, as the old saying "money is the root of all evil" illustrates. However my meaning is more specific and diagnostic. My assertion rests not only on money's role in the GFC, and the Great Depression before it, but also on two technicalities.

First, money is recognised by economists as a signalling medium. The flow of money through an economy reflects people's evaluations of the worth of the things they buy, and tells others what those evaluations are. In any system of interacting parts, the connections among the parts govern its overall behaviour. Money provides one of the primary connections among economic agents, so its behaviour can have a profound affect on the behaviour of the system.

Second is a more technical property of money: money connects the present with the future. Because the future is unknown, money brings in risk, as the GFC illustrated: many people lost their bets on the future. Even more fundamentally, money operates in the domain of changes in the economy. In mathematical terms, it relates to and affects the *time derivatives* of economic variables. It is therefore crucial to understanding how an economy develops in time.

Still speaking in technical terms, a financial collapse is a dynamic episode. Things are not close to a balance, they are way out of balance. Mainstream economics, with its fetish for equilibrium, simply cannot address the behaviour of an economy far from equilibrium, as we have already seen in Chapter 4, discussing the internal instabilities of complex systems. Money and debt are intrinsically dynamical economic variables, because they relate the future to the present, so they are central to a consideration of what we might call *dynamical economics*.

In this and following chapters we will look carefully at the nature of money, and then enquire into the roles of money and debt in a modern economy. There is much confusion

even about the nature of money, so to clarify the nature of money it is helpful to look at very basic and simple situations, as I have done occasionally in this book. We will also need to look into how banking works and the role of banks in creating money. We can then look at how money affects our economies and at alternative arrangements that might function less destructively. It is helpful to begin with a historical illustration of a different and very promising arrangement that was, unfortunately, nipped in the bud[82-84].

Pre-empting Hitler - the path not taken

In 1932 the town of Wörgl in Austria was severely depressed. Unemployment was about 30% and the town was having difficulty paying its workers because citizens had fallen behind in paying their taxes. About 200 families were penniless. Conditions were as bad in neighbouring towns as well. There were many things that needed to be done in the town, such as re-paving the streets, and extending the town's water supply. There were also people able to do the work. The problem was a lack of money, which was caused by the economic depression.

Rather than spending the meagre 40,000 schillings on hand directly on town works, Mayor Michael Unterguggenberger decided to bank it as a guarantee to back the issue by the town of a kind of money called stamp scrip. For this scrip to remain valid, a stamp to the value of 1% of the scrip's face value had to be pasted on the back every month. In effect, the value of the money declined by 1% per month. The money was issued by paying the town employees half in official money and half in stamp scrip money.

Since no-one wanted to be holding the money at the end of the month, they spent it as fast as they could. This was really not a problem, since people were desperate anyway for the things they could buy with it. Some even paid their taxes early. Stores agreed to accept the scrip because people did not have much official money anyway, and because they would lose business to rival stores if they did not accept it. In this way the stamp scrip spread through the entire community and was used for many things besides public works.

For a period of about a year, activity in the town increased substantially, unemployment fell by 25%, and the town was able to undertake long-neglected public works. The fees collected from the stamp scrip were used to feed over 200 destitute families. Investment in productive assets in Wörgl jumped by over 200% within a year. The town began to prosper in the midst of severe depression. Neighbouring villages copied the idea because it was working so well, and within a year mayors from all over Austria were wanting to know about "the miracle of Wörgl".

The idea of stamp scrip had been developed by Silvio Gessell, who first published his penetrating ideas in 1904[82]. The stamp scrip money in Wörgl circulated at about 12 times the rate of official money, because people always spent the stamp scrip first, so as to minimise the cost of the stamps required to keep it current. As a result the money issued by the town was far more effective at stimulating (or rather, facilitating)

local economic activity than if the Mayor had just spent his meagre supply of official currency on public works.

Similar events had unfolded at Schwanenkirchen in Germany, a small village in which the main industry was a coal mine. The mine was in danger of closing, but the owner offered to keep it open if his workers would agree to be paid 90% of their wages in stamp scrip. This scrip was backed by the value of the coal they would extract from the mine. The workers did agree, and within a few months the town had returned to prosperity in the midst of Germany's depression. This scrip circulated widely outside Schwanenkirchen and became the focus of a Free Economy (Freiwirtschaft) movement in Germany. Over 2000 corporations throughout Germany started to use the alternative currency.

Schwanenkirchen and Wörgl attracted considerable attention, and many other Austrian and German towns showed interest in issuing stamp scrip. However in the cases of both Schwanenkirchen (1931) and Wörgl (1933) the national governments intervened and outlawed the scrip. They did this under pressure from their central banks, whose monopoly was threatened. Wörgl sued the Austrian central bank, and the case went to the Austrian Supreme Court, but was lost. So the towns returned to high unemployment, despair and desperation.

The fortunes of the Nazi Party in Germany closely followed the level of unemployment[84]. Between 1924 and 1928, following the disastrous period of hyper-inflation of Germany's official currency, unemployment declined from 340,000 to 268,000 and the Nazi share of seats gained in elections declined from 6.6% to 2.6%. By September 1930 unemployment had risen to over 1 million and the Nazis held 18% of seats. By March 1933, unemployment was 5.6 million and the Nazis held 44% of seats. In November 1933 they gained 92% of seats.

Many unofficial exchange or currency experiments were also tried in the United States during the 1930s depression, although they were not always well set up and some of them did not succeed[82]. The eminent economist Irving Fisher, together with Hans Cohrssen, proposed in 1933 that stamp scrip be introduced officially into the US[85], but their proposal was turned down on the grounds that it would undermine the established monetary system[83].

Instead President Roosevelt borrowed official currency to fund the work-creation projects of the New Deal. Although these projects helped many people, their effects were marginal and the United States did not really emerge from the depression until it became involved in World War II.

The German path out of depression was through Fascism, which quickly led to war. Although the United States did not provoke war, it only emerged from depression when the requirements of war forced it to re-organise its production systems. Part of that re-organisation involved the issuing of a great deal more money than had been available during the 1930s.

Schwanenkirchen and Wörgl also emerged from depression, although only briefly. They followed a quite different path, a path that involved local initiative, free

enterprise and a well-designed currency that liberated the local initiative and enterprise. These towns required no help from their national governments. All they required was to be left to prosper.

There is a larger lesson here. The depression was caused by a failure of organisation, not by a lack of resources, talent or initiative. In each example, depression was overcome by a change of organisation. The crucial change is most readily apparent from the cases of Wörgl and Schwanenkirchen – the crucial change is simply to ensure a sufficient supply of currency, which allows people to do what they want to do.

To clarify money and its role, we have to start with the basic nature of money. A core feature of modern economies is specialisation. Rather than each of us trying to produce everything we need, we specialise in producing one thing, and become much better at it than a non-specialist would be. However in order to get all the things we need, we must *exchange* our one product for the many other products we also need, each product made by someone else. An electrician specialises in wiring buildings for electricity. However he can't eat electrical wiring or electricity, so he must *exchange* his service for groceries and other things he needs. This central role of specialisation in modern economies was highlighted by Adam Smith in his *Wealth of Nations*[20], though the insight can be traced back much further in history[86].

Of course we don't pay the electrician in groceries. We pay the electrician with money, and he can then use the money to buy groceries. However I wanted to emphasise that *exchange* is the fundamental economic act in a specialised economy. Money is merely a device that facilitates exchange. If we keep sight of the fact that the point of money is to facilitate exchange, we can break through the powerful mystique and enormous confusion that surround the topic of money.

Money is a very powerful invention. Without money we would have to barter for everything we want, and barter is an inefficient process. You have to have what I want, and I have to have what you want. Either that or you have to accept something you don't want in hopes you can later exchange it for what you do want. Without money we would spend most of our time trying to barter, and highly specialised economies would not be possible.

It is not widely appreciated that money can take many different forms. I don't just mean it can take the form of coins or notes or numbers in a computer. I mean it can be created in different ways, and with different rules applying to its use. The stamp scrip of Wörgl provides one example of such a rule, in which the money required a stamp every month in order to retain its worth. In our dominant monetary system, most money is created in the course of making loans, so interest is charged on it so long as it exists, a fact that may not be apparent to many people. This way of creating money also means our money supply is entangled with the investment process, and that causes major problems in our economic system, as we will see later. This system also facilitates the pumping of wealth from the poorer to the richer.

There are alternative forms of money that promise to exert healthier influences. We will look later at a monetary system that tends to minimise debt and to stimulate (or at least to remove inhibitions on) exchange. It can also separate the supply of money from the investment process. Minimising debt and separating money supply from investment help to keep the economy stable, and facilitating exchange helps to keep our focus on exchange as the central economic act, rather than on the accumulation of money.

If the rules under which money is created and used powerfully affect the economy, then the people who control and monitor the rules, and the creation and use of money, can become very powerful people. Therein lies a long and sorry tale. It is plausible to claim that the manipulation of the money supply for the benefit of a few is the greatest, most persistent, most destructive and least visible dysfunction in modern economies. Some of the greatest concentrations of wealth in history have begun or grown through banking, the names Medici and Rothschild being two of the better known examples.

To find our way through the labyrinths of confusion that surround this topic we must first understand what money is at a simple and fundamental level. We can then look at how the rules of money have been manipulated for the benefit of a few. We can also can survey the deprivation, conflict and destruction caused by our dominant form of money. Finally we can look at healthy alternative forms of money, forms that could transform our economic relationships, both within our societies and between our societies and nature.

Before we proceed, however, it will help to note that common terminology concerning money is both imprecise and confused, and even technical terminology is not very clear. For example the terms capital, wealth and money are used almost interchangeably in common usage. Yet we need to distinguish clearly among the value of a productive asset, such as a factory, the value of a fixed asset, such as a house, the amount of money in a bank account, the total value of all that a person owns (wealth?), value that is available to be invested (capital?), the expression of value in terms of an amount of money, and the role of money in the process of exchange. I will try always to be clear to which of these I refer. Money itself can be referred to as money, currency, cash, notes, coins or capital. It will be helpful to specify a terminology for this discussion, as follows. Others may use the words differently, but this is what I mean. The distinctions will be clarified as we go along.

Some definitions

Cash: notes and coins.

Money: a medium of exchange (that may or may not have intrinsic value).

Commodity money: a medium of exchange with intrinsic value (e.g. tobacco, pigs).

Currency: a medium of exchange with no intrinsic value (also *token money*).

Backed currency: token money backed by a commodity (e.g. grain, gold).

Wealth: any material thing valued by others, so you could exchange it for money or other things you value.

Capital: too ill-defined to be useful.

Note also that currency might be in the form of cash, an entry in a book, or a number in a computer.

Another distinction frequently not made clear is the use of the terms *credit* and *debit* or *debt*. To be clear we must of course specify *who owes* and *who is owed*, since for every credit there is a corresponding debt. For example common currency is sometimes referred to as credit money and sometimes as debt money. It is both, because the bank grants credit and the holder of the money owes a debt. The professional literature seems particularly prone to this ambiguity, presumably because unspoken conventions are implied. This practice serves well to keep the masses ignorant, whether or not that is the intention.

The fundamental act of economic activity is exchange. If Jane is good at raising pigs and Tom is good at growing wheat, then they might each do what they're good at and then exchange a pig for some wheat. They could do this without the use of money, or in other words they could barter. This simple example illustrates the point of all economic exchange, which is to increase value. Jane could grow her own wheat, and Tom could raise his own pigs, but they work more efficiently if they each do what they're good at and then exchange. Being able to exchange gives them more value for the work they invest.

To put it another way, Jane and Tom gain more value if they specialise and then exchange. This is a founding principle of economics, famously expounded by Adam Smith. The story of civilisation, and of the industrial revolution, is as much a story of specialisation as it is of technical innovation. Or to put it in Eric Beinhocker's terms, it is as much about *social innovation* as *technical innovation*[39].

I will walk us through some basic examples of exchange in order to bring out key features of money. Sometimes we don't think much about familiar things, just because they are so familiar, so we must make a special effort to examine them afresh.

Thus, suppose Tom would like a pig from Jane but Tom's wheat crop is not yet ready to harvest. If Jane trusts Tom she might be willing to give him the pig now and have Tom give her the wheat when it's ready. But suppose Tom is a stickler, and he writes a formal little note that says "Tom owes Jane one pig's worth of wheat" and gives it to Jane in exchange for the pig. Later, at harvest time, Tom delivers the wheat to Jane and she gives him the note in exchange, since she doesn't want to claim any more wheat from Tom. Tom can throw the note in the fire, because he has fulfilled his promise and the note has no more purpose. Figure 10.1 is a little diagram of the two-part exchange. Tom's note is depicted as IOU (I owe you: Tom's promise to Jane).

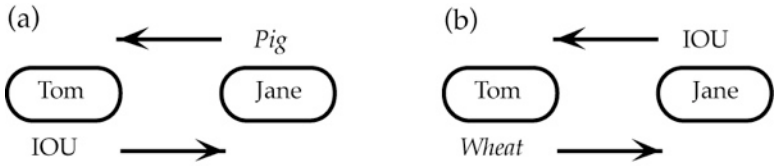


Figure 10.1 A split barter. (a) Jane accepts Tom's promise (IOU) in exchange for one of her pigs. (b) When the wheat is ready, Tom exchanges some of his wheat for the IOU that Jane has held.

I'm belabouring this simple example, and a couple to follow, because we're on our way to clarifying exactly what role money plays, and some different forms it can take. You could even say that Tom's note is a rudimentary form of money. Now here is a key point: Tom's note allowed Tom and Jane to break their exchange into two parts, as is spelled out in Figure 10.1. In the first part, a pig is exchanged for an IOU. In the second part, the IOU is exchanged for some wheat. E. C. Riegel[87] called such a two-part exchange *split barter*.

However this example does not yet bring out the full power of Tom's IOU, and of split barter. We can do that by looking at a three-way exchange, like the one depicted in Figure 10.2.

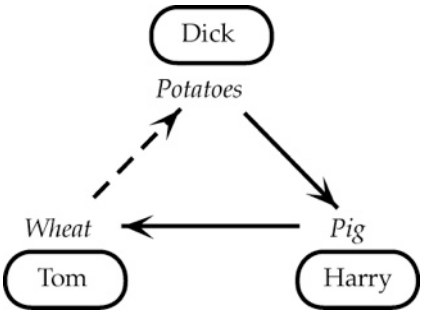


Figure 10.2 A three-way barter, with delay.

The well-known problem with barter is that you have to find someone who has what you want, and who wants what you have. Harry has a pig, but he doesn't want Tom's wheat, he wants Dick's potatoes. Dick wants Tom's wheat (which is not ready yet), but Tom doesn't want Dick's potatoes, and so on. Now it happens there's a three-way match here, and if they're patient and trusting they might do the three-way barter, with delay, as depicted. Notice, by the way, that Dick has to wait for Tom's wheat, and if he's already given Harry some potatoes then for a time he has less value: Tom owes him a debt, just as Tom owed Jane a debt in the first example.

A second possibility would be to do an *indirect barter*. Even though Dick doesn't want a pig, he might accept it from Harry in exchange for the potatoes that Harry wants, as

depicted in Figure 10.3(a). Then, when Tom's wheat is ready, Dick could exchange the pig for some wheat with Tom (Figure 10.3b). The pig would then have functioned as money. Pigs are actually used as money in some cultures. We can call the pig an example of *commodity money*. In this case there is no debt: Dick always has full value, in the form of either potatoes or a pig. This is because the pig, the medium of exchange, has intrinsic value, as commodity money was defined earlier to have.

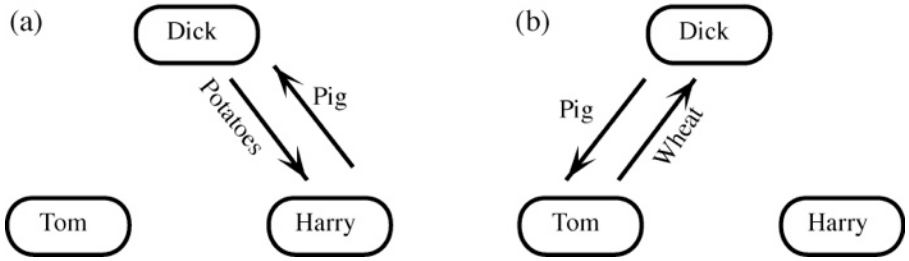


Figure 10.3 An indirect barter.

A third possibility is for Tom to write an IOU. The exchanges could then proceed as illustrated in Figure 10.4. Tom and Harry exchange a pig for Tom's IOU. If Dick knows and trusts Tom, he might be willing to accept Tom's IOU from Harry in exchange for giving Harry some of his potatoes. Later, when Tom's wheat is ready, Dick can present Tom's IOU and get some wheat in return. In this example, Tom's IOU will have *circulated as money*. (Tom might have rephrased his note "Tom owes the bearer wheat to the value of one pig.")

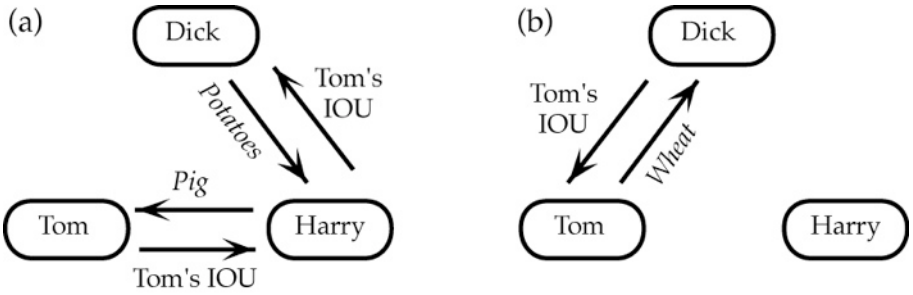


Figure 10.4 A three-way split barter.

We can now begin to see the full power of split barter, because if other people know and trust Tom, then his note might not pass just from Harry to Dick, it might circulate around the local community, facilitating other exchanges, before eventually returning to Tom at harvest time. Tom's note is *token money*, money with no intrinsic value of its own: it is just a piece of paper with some words on it. The role of token money is to permit *split*

barter, and the power of split barter is that people doing exchanges don't have to have matching wants. Tom can do half of an exchange with Harry, and later he can do the other half with Dick (or whoever bears his note).

Now it's time to draw out some important properties of token money. Money is described in various ways and claimed to have various properties. For example money is said to be a medium of exchange, a store of value, or a measure of value. It is commonly equated to wealth. Money is often claimed to require a backing commodity, such as gold. It is even claimed to be a commodity itself, just another object of trade and speculation whose value depends on supply and demand.

Tom's note has facilitated exchange, so clearly it is a medium of exchange. Tom's note may appear to be backed by a commodity, namely a quantity of wheat, but the wheat did not exist when the note was written. Tom's note is only useful if other people trust Tom's word, so Tom's note is really backed by Tom's promise. (This will be clarified further as we look at standardised money shortly.) Tom's promise has value only in a community or society in which mutual trust exists.

Token money could not operate in Hayek's world of coldly calculating, mistrustful reptiles. The fact that neoliberals nevertheless depend on using token money is another fundamental internal contradiction in their ideology. Come to think of it, it would have rather slowed their takeover of the world if they'd had to use pigs as their medium of exchange. Feeding and cleaning up after all those pigs would be a healthy reminder of the distinction between tokens of value and real value.

In the first example, with Tom and Jane, we can see more clearly that Tom's note is really the expression of a social contract between Tom and Jane. Because it is a contract, it was created when the agreement was made and it can be destroyed when the agreement is fulfilled. (With this perspective, we don't have to be horrified that money is sometimes destroyed - Tom burnt his note, and a bank de-issues or destroys money as a loan is payed off). To the giver of the note, it represents a promise to deliver a service – as has been explicit in our examples. On the other hand to the bearer of the note it represents a claim on someone else's service (in this case, Tom's).

We now come to an especially important property of Tom's note. Tom's note represents a claim on *future* service. The contract between Tom and Jane *links the future to the present*, because Jane must agree to hold her wish for some wheat in abeyance, expecting the agreement to be fulfilled in the future. As noted earlier, this linking of the future to the present is fundamentally important for understanding the dynamics of an economic system, as it means, in the language of calculus, the primary signalling mechanism in the system involves time-derivatives. The neoclassical theory deals with a static equilibrium that excludes time, so it excludes this crucial property of token money and cannot describe the way economies develop over time, nor properly describe the role and influence of money.

In the meantime Tom owes a debt to Jane and Jane is owed a debt by Tom. Thus the note represents a *debt*. With the introduction of debt comes *risk*. The risk arises from the linking of the future to the present, because we can't be sure what the future will bring. If Tom's crop is destroyed by a hailstorm, Jane will lose – she gave a pig but got nothing in

return. This highlights a second critical property of token money, that it introduces *debt and risk*.

Finally, if Tom's note functions as money, then obviously his issue of it increases the money supply.

So far the discussion has been in terms of Tom's note, which may not seem much like normal money, despite my assertion that the note functioned as money. To make the connection clearer, suppose the people in Tom's community like the way his note helped them to exchange things, but they realise it would be more useful if they could use a standardised form of note, or promise. So (moving the story right along) they get the local printer to print up some notes that say "The bearer is owed goods or services to the value of one dollar", and they agree that one dollar stands for the value of one kilogram of wheat. They also ask the printer to keep track of how many notes are issued to each person who wants some, in other words to keep track of each person's promises. The printer decides to set up a side business to perform the note-printing and accounting, for which he will of course charge an appropriate fee. The printer decides to call this business Community Bank.

In this new arrangement the examples we have looked at would proceed as depicted in Figure 10.5. Thus Tom *withdraws* some notes from the Bank, which records a debit balance in Tom's account. Tom then *issues* the notes into circulation by buying a pig from Harry. Harry thus *earns* the money, which he then *spends* on some potatoes from Dick. Since Tom has no wheat yet, Dick *deposits* his notes with the bank, which credits the notes to his account. Later Tom sells some wheat to Jane, thereby earning money which he deposits, and his account is credited with this amount.

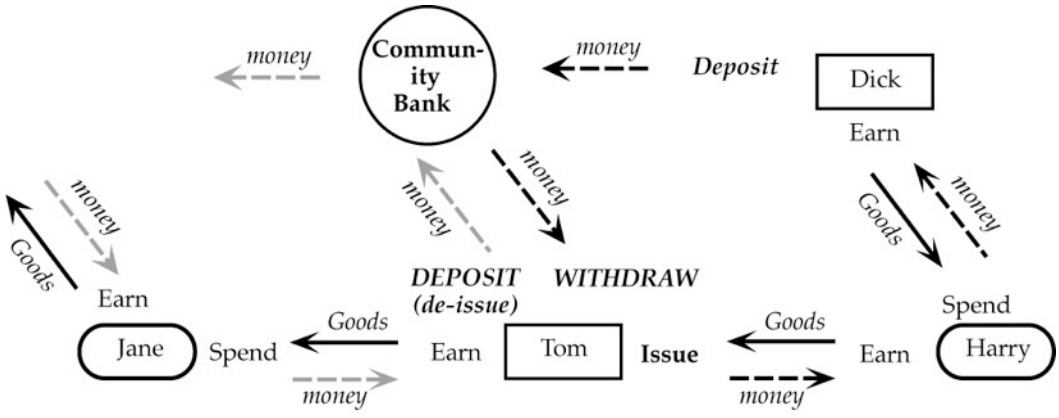


Figure 10.5. The same transactions using standardised money obtained from a bank.

Just to clarify the terminology, because Tom initially withdrew money, he has a debit balance which his new deposit will reduce (perhaps to zero). Since he initially *issued* some money, his deposit also *de-issues* money. On the other hand Dick's deposit will be held as a

credit balance and the money might be regarded as still being in circulation, since it does not reduce anyone's debit balance and therefore does not amount to de-issuing. Tom's *debit* balance cannot be regarded as being in circulation, because it is just the record of his debt that complements the *money* he spent into circulation. (My use of the terms *issue* and *de-issue* may not be standard terminology. The reasons for using these them in this way will be clarified shortly.)

These standardised notes should be more recognisable as the kind of money we are used to, yet they still have all the properties that Tom's IOU had. Thus the exchange of a standardised note implies a contract requiring the promise of delivery of a service. The exchange also implies a debt, it links the future to the present and it thereby involves risk.

If you have a ten dollar note, the note expresses a debt owed to you by your community. You may not be used to thinking of it this way, but think about where your money comes from. If you are employed, then you contribute your services to your employer and in return he gives you some pieces of paper, or some numbers in a computer. You are definitely owed! The debt can be redeemed if you take your notes (or your debit card) to a store and buy some groceries. On the other hand if Tom, rather than earning money, simply withdraws some new money from the bank and issues it in exchange for a pig, then Tom is certainly taking on an obligation. That's why Tom's action is called *issuing*, rather than *spending*: he is incurring a debt rather than calling in a debt. Tom owes a debt to the community. His obligation is to return to the community equal value in goods or services. He can do this by providing wheat in exchange for money, which he then deposits and extinguishes his debt.

Seen in this form, it is clear that token money has no intrinsic value, nor is it backed by any specific commodity. Rather it is backed by the promise of the community to deliver value in goods or services in exchange for the money. The value of token money thus depends on the existence of a *trusting community*.

Token money can be regarded as a high-level emergent phenomenon. In terms of our earlier discussion of systems and emergence, a society is an emergent property of a sufficiently large group of interacting people, an economy is an emergent phenomenon in a society, and token money is an emergent phenomenon in an economy.

We can dispose of the claim that money should be backed by gold, as it used to be (or was alleged to be) before the "gold standard" was discarded. Token money, in a trusting community, does not need to be backed by gold or any other commodity. It's true that in order to maintain a steady value the money supply must be carefully managed, but that is a different issue. Anyway the value of gold is also volatile, depending as it does on arbitrary fluctuations in supply as gold discoveries are made, on hoarding, and on peoples' highly subjective valuation of gold as an ornament, as an imperishable commodity or even as a symbol of immortality.

Not all exchange occurs in a context of trust, such as in low-trust societies or in international dealings. In situations where trust is lacking it *does* make sense for money to be backed by things of real value. Bernard Lietaer[84] has therefore proposed a *backed currency*, which he calls a *Terra*, backed by a 'basket' of commodities that can be stored in warehouses. It could be beneficial especially for poorer countries whose currencies may

be vulnerable to global forces. The particular mix of commodities would be determined by each country using those of its products that best retain their value.

Token money, whether it is backed by community trust or by a commodity, is not itself wealth, it is a token of wealth. We might also think of it as *potential wealth*. It has no immediate value in itself, but it holds the potential of being converted into wealth. Wealth, as I defined it earlier, is the value to a person of real things, be they food, a house, an axe, a factory, or a piece of land close to services or accessible to many potential customers.

Before leaving the example in Figure 10.5, a couple of other features are worth noting. Money circulates in one direction while goods and services circulate in the opposite direction. However the Bank is not involved in the circulation of goods and services, only in the money circuit. This reflects the Bank's special role, as the source and sink of money, and also the fact that the money has no intrinsic value. (On the other hand the banker, the person who ensures the Bank performs its special functions, has to eat, and can treat himself as just another client of the Bank.) Putting it another way, the role of the Community Bank is only to supply a medium of exchange.

The *monetary system* depicted in Figure 10.5 is a bare-bones version that can be fleshed out into various forms, a key consideration being how the Bank's service is paid for. In our dominant monetary system, interest is charged on currency, which is supplied in the form of "loans". In the Austrian town of Wörgl, during the depression, a fee was charged on circulating money. A stamp had to be affixed to the back of the money each month in order for it to keep its value, so it was called *stamp scrip*. If you were silly enough to deposit some stamp scrip in the bank, a fee would be charged on your credit balance. In effect the value of stamp scrip *shrinks* (whereas the value of conventional money *grows* in a savings account, though it may not keep up with inflation). Ancient Egypt had shrinking money, in the form of tokens that were receipts for grain deposited in grain storages – because the grain deteriorated, the value of the tokens declined as time passed. Another form of shrinking money was common in the Middle Ages[83,84].

Another monetary system, sometimes called a *mutual credit union*, charges a fee on *both* credit and debit balances[82]. The fee on a debit balance is (partly) analogous to an interest charge in our dominant system. This kind of system has been used on small scales, but it has some important virtues that recommend it for wider use. Principal among these is that it tends to minimise debt, in contrast to our present system. We will return to it in Chapter 14, and explain its operation and virtues more fully.

There are actually already quite a few different kinds of currency operating in parallel to national currencies, many of them at the small, community level but some as so-called barter systems among businesses. Even airline frequent-flyer points can be thought of as money, though obviously with a limited range of use. Such "loyalty" schemes are used increasingly by other businesses as well. This is a large and worthy topic that we will return to in Chapter 14, though it won't be pursued in great detail in this book. For more detail on local and alternative currencies see Lietaer[84], Greco[82], Kennedy[83] and Kent[88].

There is also a longer review in Davies[1], but note the caution on this topic mentioned in the Postscript.

11. Economic Fire

Token money is a form of debt. It is an implicit contract, promising the delivery of goods or services in the future. Because the future may not turn out as we hope, debt carries risk. Money is a powerful invention, but it is risky as well. Fire is also powerful, and also risky.

Because of the risk it carries, it might be wise to minimise the amount of debt we create in the form of token money. Yet our present system tends continually to increase the amount of money in circulation. This is because the suppliers of money make more profit if they supply more money. It is also because the supply of money is deemed to be an appropriate activity to be entrusted to profit-seeking private entities. Worse still, our financial sector creates debt in many other forms as well, and the amounts of such debt dwarf the money supply, and have even dwarfed the productive economy.

Most of our money comes from banks, who create it out of nothing according to their perceived needs. Banks are not well understood by most people. There is a general idea that banks accept deposits and make loans, but banks' operations are much more complex than that. Banks do operate under government-imposed rules, but the rules have been changed and loosened over the past several decades. The rules now are so complex and jargon-laden that it is difficult for any but the most expert to really understand them. What the banks do within those rules, and how closely they remain within them, are even harder to fathom. Nevertheless some key underlying features can be discerned, and they have a large effect on the behaviour of our economy.

Banks developed from the practices of money changers and money lenders in the Middle Ages. To understand their modern form, it might help to briefly recount a little of the history of banks, and of money.

Many things have been used for money, including grain and livestock. Grain was used extensively as currency in ancient Egypt, and a sophisticated banking system was developed around it. Not only pigs but even cattle have been used as an exchange medium. Sophisticated London financiers might prefer not to know that the English words *chattel* and *capital* both derive from the same root as *cattle*, while *pecuniary* comes from the French and Latin *pecus*, meaning cattle[89].

However livestock can die and grain can rot or be eaten by rodents, so there are benefits in using something more durable, and also more compact and easily transported. For this reason, valued decorative items like jewelry, shells, precious stones and precious metals have been used as money in many cultures[89]. Precious metals have the advantage of being compact, durable and divisible. Their value is usually in proportion to their quantity, which can be determined by weighing. The English words *spend*, *expenditure* and *pound* come from the Latin *expendere*, meaning "to weigh". To save the bother of weighing, precious metals can be pressed into standard sizes, which can be counted. This is the origin of coins, which became widespread with the Greeks and Romans.

Coins made of precious metals can work well as money, but a problem emerged as commerce and trade grew. There is no particular relationship between the needs of commerce and the rate of discovery of gold and silver. At times, in history, there has been a severe shortage of precious metals, and this has severely restricted trade and commerce. The gold rushes in California and Australia in the 1850s facilitated a significant boom in world commerce. In Britain foreign trade also caused the amount of gold in the country to fluctuate by large amounts, so that at times there was a severe shortage[14].

One attempted solution to the shortage of gold was to alloy it with more available but cheaper metals, so that more money could be made with the same amount of gold. This resulted in the intrinsic value of the coins being explicitly less than their face value. In other words, money became to some degree only a token of real value. This became even more explicit with the introduction of paper money, whose intrinsic value is usually negligible in comparison with its face value.

Cutting or diluting the intrinsic value of coins was a form of taxation, and it came to be known as *seigniorage*. This practice was widespread in Europe during the middle ages, and it was also a feature of the ancient Egyptian system. In the Egyptian system tokens were issued to function as receipts for grain kept in grain storages, and the tokens were widely used as money. However the tokens lost value with time, to take account of the inevitable wastage of the stored grain. The periods in which such systems operated were periods of prosperity and creativity in both Egypt and Europe, the pyramids and cathedrals being the most visible manifestations. There is an important lesson to be learnt from these systems.

With the spread of various kinds of money, money changers became common in the ancient and medieval worlds. They also functioned as money lenders, commonly charging large fees or interest on the money they loaned. Since they necessarily had to have the means to store large amounts of money, it was natural that people sought to store their money and other valuables with them. In this case the money lenders would issue a piece of paper, a receipt, stating that money to a certain value was reclaimable from them. The table or bench from which the money lenders operated was known in Italy as *banco*, from which our word bank derives[14].

Receipts from money lenders came to be used as money themselves. Rather than reclaiming coins from the money lender to pay a debt, people would just pay their debts by giving their creditor their claim on coins held by the money lender. As this practice grew, coins were replaced in circulation by paper money, and the coins tended to

accumulate with money lenders. Money lenders soon learned that they could satisfy the remaining demand for circulating coins with only a fraction of the coins deposited with them, so they began to lend out the idle coins, with the usual interest charge applying. If the money lenders loaned money without the knowledge of the owners of the money and without sharing the profits with them, then they were lending money that was not theirs, but since nobody knew how much total money was deposited with them nobody needed to know the fraud they were practicing.

This fraudulent practice worked so long as there was not an unusually high demand for coins and so long as no-one suspected that the money lenders did not hold enough coins to cover the paper money they had issued. As soon as such suspicion arose, as it not-infrequently did, there would be a rush of people wanting to exchange their paper money for "real" coin-money. If the money lender ran out of coins, he would be bankrupt, and his life might be in danger. The word *bankrupt* comes from the practice of breaking (rupturing) the bench (banco) of bankrupt money lenders.

To forestall bankruptcy, a money lender would, if he was still able, "call in" his loans of coin so as to pay his creditors. His debtors might be forced suddenly to sell assets in order to raise money to repay the money lender. Money lenders took advantage of laws (which they may have been influential in creating) giving them the right to claim ownership of assets of debtors who could not pay. Thus the money lender's efforts to maintain his fraud and so to remain solvent would cause a wave of disruption through the community.

The fraud and consequent potential for disruption were compounded by the fact that many borrowers from money lenders were happy to receive a promissory note instead of the actual coins notionally being borrowed. These notes could take the same form as the receipts issued to depositors, since all that was required in either case was a note promising to exchange the note for coins. As these paper notes gained acceptance as money they circulated for quite long periods, so the amount of coinage required to redeem the notes, in normal times, was further reduced. This allowed the money lenders to lend out deposited coins not just once but notionally several times over in the form of paper notes. Although the risk of a rush or run was increased, the money lender could, by careful observation, establish a safe fraction of coinage to keep as "reserve" for redeeming notes as they came in.

This additional level of mischief in the money lenders' fraud involved two additional and far-reaching problems. First, the issuing of fraudulent notes actually increased the money supply, and this might devalue the existing money. Second, if a money lender called in a loan, he would require repayment in coins, even though the loan had been issued as paper. The debtors' efforts to acquire enough coins would then cause a shortage of coins which would in turn impede commerce. This problem would exist even in normal times if the money lender required the interest on his loans to be paid in coins.

We can describe the resulting kind of money as debt-burdened, fractional-reserve money. It comes burdened with debt because it is issued as though pre-existing money is being lent, so interest accumulates on it. The money is backed by reserves that are only a fraction of the value it is claimed to represent. Such money is intrinsically unstable, quite

apart from being fraudulent. The supply of money tends to expand in good times and then to contract suddenly if people start defaulting on loans and the money lender responds by calling in loans. Neither the expansion nor the contraction is closely related to the needs of commerce, and so both the expansion and the contraction are disruptive.

Large national banking systems grew out of such dubious beginnings. The Bank of England was founded by Royal Charter as a private company in 1698. The king had been having difficulties paying his army because there was a general shortage of silver and gold in England. He had amassed debts totalling £20 million. The king was advised, and so decided, to charter a prominent banker (money lender), William Patterson, to supply the king with gold from his bank's reserves, in the form of a loan, and also to supply the king with paper money to the same value as the gold. The original prospectus of the Bank of England included the statement that "*The bank hath benefit on the interest on all monies which it creates out of nothing*"[14]. In other words, the bank could charge interest on the paper money it loaned to the king, as well as on the gold, even though the paper money was created out of nothing. It is curious that the king endorsed a private company's legal right to create money, rather than claiming it for himself. It seems plausible that the king was conned.

Basically the king temporarily relieved his cash flow problem by borrowing money from one of the wealthiest money lenders in London. Michael Rowbotham[14] observes that the British Government has remained in debt from that day to this.

However this did not solve England's or the king's money problems. A major difficulty was that stocks of gold and silver within England fluctuated by factors of 5 or 10 because trade was conducted primarily with gold and silver and the balance of trade fluctuated considerably. In 1797 a serious shortage of gold coincided with the beginning of England's war with Napoleon. The Bank of England's gold stocks had fallen from £7 million to £1 million. There was insufficient gold to back the Bank of England's notes. It was decided to end the requirement that bank notes could be exchanged for gold, and England's currency became founded solely on bank lending. The government borrowed heavily to finance its war with France.

In 1815, with the war over, the government set about paying off its debt, which had more than doubled. As it did so, the amount of money in circulation necessarily declined. This is because much of the circulating money had been borrowed by the government from the Bank of England, and now the government was gathering that money and paying it back to the bank (with interest, of course). The problem was magnified by the fact that many smaller banks had sprung up which used Bank of England (BE) notes as a reserve upon which they issued their own notes. As the supply of BE notes dwindled, the smaller banks were force to call in their loans in order to reduce their level of lending in proportion to their declining stocks of BE notes. Within a few years the amount of money dropped by two-thirds, from £48 million to as little as £16 million in 1822. A savage depression resulted[14]. Therein lies another profound lesson, one that we will take up in the next chapter.

There is a text-book version of how modern banks issue money, and the system it describes is called fractional reserve, reflecting its similarity to the partial reserves held by money changers. However banking has developed beyond this in at least two important ways. One is that in some countries simple reserve requirements have been replaced with "capital adequacy guidelines". The other is that empirical evidence indicates that banks first loan money, then look for adequate reserves, rather than reserves leading loans. Furthermore the amount of debt is several times greater than the amount of circulating money, contrary to what the fractional reserve story predicts. The net result is that banks are a lot freer to create money for loans than neoclassical theorists typically assume.

The fractional reserve system can be confusing at first, and you have to step carefully through the details to see its results. Appendix A gives more detail on how it works. I will just give the take-home messages here. In the text-book fractional reserve system, if the reserve fraction is 10% then banks can loan out about nine times what they have in deposits. In other words they have to keep in reserve only about 10% of what they loan out. The reserve fraction varies quite a lot among different countries, but that is a fairly typical value. So banks don't just loan money that has been deposited with them. Instead, every time they make a loan, about 90% of it is new money, created out of nothing.

There are two important consequences of fractional reserves. First, every time a loan is granted the money supply increases, and conversely as the loan is paid off the money supply decreases. Second, because new money is issued as part of a loan, the bank charges interest on it. Each of these features affects how the larger economy behaves.

This system has been extended or modified by requiring "capital adequacy", which allows banks to count more than just reserves to determine how much they may loan. The Reserve Bank of Australia (RBA) describes the capital in its capital adequacy guidelines loosely in these terms: "A bank's capital can be viewed as evidence of the willingness of shareholders to commit their own funds to a bank on a permanent basis, as interest free resources and, ultimately, as a cushion to absorb possible future losses."[90] Consistent with agreed international standards, it ascribes risk weightings to various categories of a bank's assets in a rather complicated calculation of its capital adequacy. The end result is a requirement "to maintain a ratio of capital to risk-weighted assets of not less than 8 per cent, with at least 4 per cent in core capital." So the end result seems to be similar in general terms, but with banks now able to count a wider range of assets than before. Thus banks can still loan much more than they have in hand and, because reserves are now only part of the total capital of a bank, a bank's capacity to extend loans has been expanded.

Now to the other extension of the fractional reserve system, or rather beyond the fractional reserve system. Economist Steve Keen argues that banks make loans first, then look for reserves[91]. Governments (through reserve banks) respond by creating enough "base money", the money used for reserves, to keep the banking system functioning. Although the US claims to run a fractional reserve system, it now only applies its 10% reserve requirement to individual deposits, and it does not have a reserve requirement for deposits by companies. Thus banks are free to loan businesses as much as they like. There are also many debt instruments created by a "shadow banking" system, and these are essentially unregulated.

The result of these developments is that by 2007 private debt in the US peaked at 47 times the amount of base money or reserve money, which is called M0. There are other measures of money, called M1, M2, etc., that include broader categories of money. For example, in the US M0 includes coins, notes and reserve deposits with the reserve bank, whereas M1 includes M0 plus "demand accounts", like cheque accounts. Figure 11.1(a) shows ratios of debt to M2 and M3. A strict fractional reserve system with a 10% reserve requirement would yield a ratio of 0.9. (Although the ratio of debt to reserves is 10, the money supply would be reserves plus debt issued. Thus the ratio of debt to money would be the ratio of debt to reserves plus debt.) Clearly there is much more debt than that. Figure 11.1(b) includes the ratio of private debt to M0, which peaked at 47 before the US Federal Reserve created more M0 money and brought the ratio down somewhat.

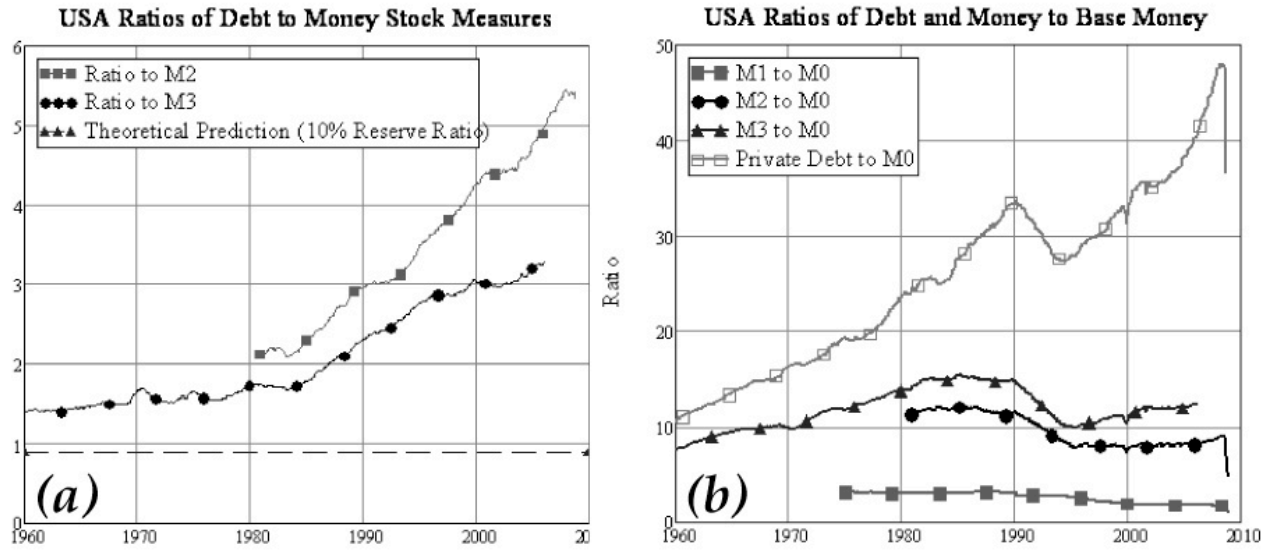


Figure 11.1. Ratios of debt and various measures of the money supply.

Keen argues that the fractional reserve system is now a minor adjunct to the dominant money system, which is close to a pure credit system. Because bank profits result mainly from making loans, their incentive is to push as much debt as the market will bear. The result has been an enormous increase in the amount of private debt relative to the GDP, as is illustrated in both Figures 8.3 and 11.1.

Since about 2000 a so-called *shadow banking system* rose to prominence. This comprises financial institutions that do not take deposits, but rather are intermediaries between investors and borrowers. Examples are investment banks, hedge funds, money market funds and insurers. Because they do not take deposits, there are few regulations on their operations. Banking regulations tend to be focussed on protecting the savings of depositors, rather than protecting investors, who are presumed to operate at their own risk.

A feature of shadow banking is the trading of so-called *derivatives*. These are basically packages of things like bonds, shares and mortgages. They probably started out just with the old idea that risk can be reduced by diversifying. If you buy shares that have a one in three chance of failing within a year, you risk losing most of your money. However, the logic goes, if you buy ten kinds of high-risk shares, the chances of all ten of them failing in one year are smaller, so you are not likely to incur such large losses. It is standard investment advice not to put all your eggs in one basket.

However derivatives became more and more complex as traders looked for ways to reduce the risk and increase the yield. Mathematicians and physicists were attracted into the field by large monetary rewards, and they applied very sophisticated analyses to market behaviour. They designed increasingly complex packages put together by computer formulas or *algorithms*. The packages became such complex mixtures of things that it became difficult to know what was really in them.

Derivatives are known by a bewildering array of acronyms. We don't need to go into much detail about them, but a few examples will give some flavour. An ABS is an asset-backed security, a package backed by things like bonds or loans. Notice that what financiers call "assets" are not physical things, they are promises of various kinds, that involve risk. The packages seem to be called securities because they are relatively low risk, and there may be regulations as to what can be called a security. One prominent kind of ABS is a CDO, a collateralised debt obligation, in which the contents are structured or ranked in order of risk, with the rights of the holder varying according to risk level. The higher ranking will be paid out first, and lower rankings may miss out.

Another prominent form of derivative is the CDS, or credit-default swap. These are basically a form of quasi-insurance, in which a lender pays a fee to an insurer, who undertakes to pay the lender in case the object of the swap (say a loan) should default. James Galbraith points out they are not really insurance because they lack the essential ingredient of loss reserves, with which losses can be covered[6]. Rather, the CDSs are really bets. Worse, third parties, other speculators, may also bet on the object failing, if a willing counter-party "insurer" can be found. A CDS sounds like a no-lose proposition for the lender, because if the object returns a profit they merely share some of it, whereas as if it returns a loss the insurer will cover the loss. It is in actually the interest of a third-party speculator that the loan does fail, because only then will they get any benefit.

Derivatives multiplied rapidly because they were extremely profitable. Financial "engineers" persuaded themselves they had solved the problem of risk, and that henceforth markets could function smoothly without being plagued by the risk of sudden losses. Because financial markets, allegedly, ensure the most efficient allocation of investments, the whole economy should function more perfectly.

They were wrong. One reason they were wrong is that the clever calculations underlying the complex derivatives were based on analysing the behaviour of real markets. That sounds like a good idea, but it means the analyses were of *past* market behaviour. If the behaviour of markets should change, the methods might not work. The behaviour of markets *did* change, and the reason they changed is that derivatives became so popular they dominated trading. In that situation risk became spread through the

market and kept growing. In technical language the risks became correlated, so that if one bet failed others were more likely to fail. As long a only a few traders were using derivatives, the risks would be uncorrelated and the past behaviour of the market could be a reasonable guide to its future behaviour. However with everyone using derivatives, the character of trading changed.

Another reason they were wrong is more familiar: the derivatives disconnected risk from profit. This was particularly true in the mortgage market. Housing prices in the US were pushed upwards by a speculative bubble. As they rose, mortgage sellers and brokers gave mortgage loans to people who were less and less likely to be able to repay the loans, including even people who were unemployed. These were known as *subprime* mortgages. These high-risk mortgages were then packaged with lower-risk mortgages into securities that were allegedly low-risk, and sold to other "investors". There were two problems with this practice. One was that the buyers should have assessed the risks better than they did. The packages were complex and difficult to assess, in which case traders should have avoided them. However the greater problem was that the mortgage brokers made a quick profit and off-loaded the risk. Therefore their incentive was to keep pushing mortgages onto people who were less and less likely to repay them.

Disconnecting risk from profit is a fundamental market failure. It is essential to the proper workings of markets that risk be born by those who stand to profit, and the subprime mortgage scam illustrates exactly why it is a problem. Had the mortgage brokers retained the risk, they would have been less enthusiastic about pushing loans onto poor prospects. The problem would not then have grown so large, and the people at fault would have borne the losses.

A third reason the clever financial engineers were wrong was that many traders did not properly assess the risks in what they were doing. A major reason for that was the impenetrable complexity of the derivates the engineers so cleverly devised. Another reason was an old and familiar one: a speculative bubble was inflating, and people were reluctant to look too closely because they were making lots of money.

The result of the rise of shadow banking and its clever and complicated financial instruments was that levels of private debt rose dramatically. Because these financial instruments are essentially bets on the future course of the market, they involve debt, and therefore risk.

Almost every institution involved in the financial system is, in the jargon, highly leveraged. This is as true of old-fashioned banks with fractional reserves and mainstream banks with capital adequacy requirements as it is of shadow banks. What does "highly leveraged" mean? It means you are betting a small amount of your own money plus a lot of other peoples' money on a large return. If the return is positive, you make a handsome profit. However if the return is negative you lose not only your stake but potentially everything you own.

For example, if you invest $1000 in an enterprise that returns 15% a year later, you make $150. However if you can persuade someone to lend you $9000 so you can invest

$10,000, then the return will be $1500. The return on your $1000 is magnified or *leveraged* to 150%. However the risk is also magnified. If the return is negative, -15%, in other words a loss, then you lose $150 on your $1000 investment and are left with only $850. But if you invested the $10,000 then you lose $1500. That means you lose all of your initial $1000 and you still owe your creditor $500.

It is time for some more parables, so we can figure out who is leveraged and who is not.

Honest Abe

Honest Abe is an old-time money changer and safe-deposit manager who issues paper receipts for coins people deposit with him, to be held in his vault. Each receipt says it may be redeemed for the equivalent value in coins. People would be able to use the receipts as money, standing in for the coins. If the value of the coins in the vault is the same as or more than the value of the paper Abe has issued, then there should never be a problem. Anyone who wants "real" money can exchange their paper notes for coins. Abe's business involves no leverage, and it does not increase the money supply..

Clever Clancy

Clever Clancy offers an arrangement with his depositors that he can loan some of their coins out, in return for a share of the profit he makes on the loans. He offers them 2% interest. His loans carry the condition that if his depositors require the coins then he can "call in" the loan, in other words require immediate repayment in coins. He loans out ninety percent of the coins, keeping only ten percent as a reserve for people who need to redeem notes for coins. His deposits, loans and reserves are summarised in Table 11.1, along with those of Abe and Slick Slim (below).

This arrangement gives some protection to Clancy and his depositors, but less to his debtors. If his depositors should want to redeem notes worth more than the coins he has on hand, he can call in some loans, retrieve the coins and pass them to his depositors. Those whose loans are called in may suddenly have to sell things for less than their full value in order to raise the coins owed to Clancy. If any debtors should be unable to repay their loans, then Clancy would lose and so would his depositors. However the risk of default should not be great if he loans wisely.

Clancy's arrangement introduces some risk for himself and his depositors, but he makes considerably more profit and his depositors also make modest profits. So long as defaults are few, the main risk is to debtors, whose lives may be disrupted by a call-in. Clancy's business can be viewed as loan brokering. However the loans are made with existing money (the coins), and so there is little risk of wider consequences. Clancy's business might appear to involve leverage, but since the loaned coins already existed and can be accessed if necessary then in principle all the paper is still backed by coins. However the business does increase the circulating money supply by 900.

Table 11.1. Summary of deposits, loans and reserves.

	Abe	Clancy	Slim start	Slim plus
Deposits (coin)	1000	1000	1000	1000
Receipts (paper)	1000	1000	1000	1000
Loans (coin)	0	900	0	0
Loans (paper)	0	0	900	9,000
Reserves (coin)	1000	100	1000	1000
Total paper (money)	1000	1000	1900	10,000
Total circulating money (c & p)	1000	1900	1900	10,000

Slick Slim

Slick Slim starts out like Clancy, except he makes his loans with paper notes rather than coins. As long as the loans total no more the 90% of the coins on deposit, his business should proceed in the same way as Clancy's. In fact it should run better, because there will be little chance of not being able to redeem notes for coins. This is because the paper he has issued would amount to less than twice the coins he has on hand, whereas Abe's deposit receipts would amount to ten times the coins he kept in reserve.

Realising this, Slim makes a crucial extension. He starts loaning more than the value of deposits. To do this he makes his receipts and his loans identical, so they both state simply that they may be redeemed for coins. Then he makes loans worth nine times the value of the coins on deposit. Slim's deposits, extended loans and reserves are included in Table 11.1. If he is careful, no-one need know he has loaned out more than he has. His reasoning is the same as before, that only ten percent of people are likely to want to exchange their notes for coins at any given time.

In making this change, Slim has leveraged his deposits by a factor of nine. He will make nine times more profit on the loans. Unfortunately he has also magnified his risk. Worse, he has created a systemic risk for his community.

Slim's scheme increases the supply of money by a factor of ten, because his notes can circulate as money. This may for a time increase economic activity in the community, because his debtors will have spent their loan-money on whatever project they got the loan for. It may also cause inflation.

> However, if for any reason Slim's depositors suspect that he might not be able to redeem their notes, there might be a rush to redeem notes and he will run out of coins. He may attempt to call in loans, requiring they be repaid in coin. This will create a shortage of coins as debtors scramble to sell things to raise the coins to repay their loans. It will also reduce confidence in the value of his paper notes. If merchants know Slim is having trouble redeeming his notes, they may refuse to accept any more in payment for goods. If that happens the notes may become worthless, and anyone holding them will lose. The supply of money will suddenly decrease, because Slim's notes cease to function as money, so the formerly booming economic activity will slow.

Unlike Clancy's scheme, the consequences of the failure of Slick Slim's scheme do not fall just on Slim and those dealing directly with him. The consequences flow through the whole community. As he expands the money supply he may trigger inflation, which affects everyone by devaluing the money they already hold. If people lose confidence in his notes, then anyone holding the notes loses, but the whole community also loses if the drop in the money supply impedes local economic activity. In conventional terms, Slick Slim's paper money first triggered an inflationary boom, then a recession. This sequence of events occurred many times through the eighteenth and nineteenth centuries.

Fractional reserve banking is also highly leveraged. Banks may issue paper loans to a value ten times the value of their reserves (for a reserve requirement of ten percent). This scheme differs from Slick Slim's mainly in that the reserve fraction is not a secret. Slick Slim practised fraud, because he let people believe he had coins equal in value to the notes he issued. Given that most people probably do not realise banks loan more than the deposits they hold, by creating new money out of nothing and charging interest on it, it is an interesting question whether the banking system is practising fraud.

Aside from that moral question, the practical result is that fractional reserve banking functions essentially in the way Slick Slim's bank did, and it generates the same kind of risk, not only for itself but for the whole community. If for any reason a lot of its loans should default, then it may not have enough reserves to cover the losses and it would become insolvent. The money involved with the defaulting loans would vanish, the money supply would suddenly drop, and a recession or depression might be triggered.

Modern banks do not practice simple fractional reserve banking any more, but they are still highly leveraged and therefore they generate at least as much risk. Banks subject to capital adequacy requirements, like Australia's, may have a broader buffer to call upon, but the concept is still that banks issue more loan-money than they could redeem in reserves, or gold or whatever. If the US fractional reserve requirement applies only to individual clients and not to business clients, then their leverage will be even larger.

Finally, the shadow banking sector is overtly one of high leverage and high risk. The financial instruments they deal in are all debt instruments, bets on the future. They

effectively multiply the money supply even more. This is how private debt came to be 47 times greater than "base money" in 2007 (Figure 11.1b).

In technical terms, the high leveraging of the banking system sets up a powerful destabilising (positive) feedback. Positive feedbacks are the ones that tend to magnify a trend. Thus in good times the feedback tends to drive the money supply up, but when bad times come the same feedback tends to drive the money supply down. Leveraged banking is a built-in generator of instability in our economies. It is a major factor in causing recessions and depressions.

12. *Burning the House Down*

In the parable of Trad (Chapter 9), if the newly cleared field turned out to be not very productive the village would not stop. All other activities of the village would continue as usual. The villagers' investment of their time and resources would have come to little, but the consequences would not go beyond that.

In contrast, when the so-called investments of Wall Street failed, the consequences were not just confined to those directly involved - the traders and those who had been foolish enough to entrust their money with the traders. Rather, the whole US economy, and much of the world's economy was slowed.

The question is why the failure of someone's new venture should interfere with everyone else's business as usual? In Trad, it did not, but in the US it did. This question seems not commonly to be asked, or perhaps is never asked, yet clearly it is a vital question. If we can answer it, we may be able to see how to insulate the business-as-usual, routine economy from the vagaries of investment, especially risky investment. That would save a lot of people a lot of misery and it would make the economy considerably more efficient.

We have glimpsed part of the answer to this question in the parable of Slick Slim in Chapter 11. Whereas the lending activities of Honest Abe and Clever Clancy did not entail much risk to those not directly involved, Slick Slim's scheme had the potential to affect the whole community. The boom and bust in the Slick Slim parable arose from two deficiencies in the money Slim issued. First, Slim's paper notes increased the money supply, and did so surreptitiously. Sufficient money, to facilitate exchange, is a good thing. But too much money, unrelated to the need for exchange, can cause inflation. Second, the value of Slim's money was not assured, and in fact it was innately prone to devalue because of the deception Slim perpetrated. Both deficiencies arose from the way Slim leveraged his stock of coins into a larger stock of paper money. The leveraging first caused the increase in the money supply and then, when confidence in his paper money evaporated, cause a sudden shrinkage in the money supply.

Modern banking systems are not based on an explicit deception like Slim's, but they are leveraged from the amount of base money or base capital in the same way as Slim's paper money was leveraged from his smaller stock of coins. This creates a destabilising (positive) feedback that can magnify small changes in fortune into large fluctuations in the money supply. The modern propensity in financial markets for high-risk "investment", often better described as speculation or gambling, ensures a plentiful supply of changes in fortune. The degree of leverage in the system can magnify one speculator's small reversal of fortune, like the flap of the butterfly's wing, until it grows into a hurricane of collapsing

prices. However the connection between investment and economic instability is more direct even than as a trigger for instabilities.

One of the great myths of our time is that our economy progresses because capitalists accumulate money ("capital") and invest it in new productive enterprises. The myth is embedded in the very word: *Capitalism*. Some of this still happens, but the dominant process today is that entrepreneurs *borrow* money to invest. The current regime would better be called *Debtism*.

Not only is much of our enterprise is financed by borrowing, rather than from savings, but much of the money "borrowed" is actually new money created out of nothing. If the money were literally borrowed, then it would be someone else's savings, in other words the borrowed money would already exist. So borrowing the existing money would not increase the supply of money.

On the other hand if the money is obtained as a "loan" from a bank, then ninety percent or more of the money is created out of nothing. That money is not loaned at all, which is why I've been putting the word in quotation marks.

This highlights the crux of the problem of economic stability. Much of the money "borrowed" for investment is new money that increases the money supply. The money supply therefore depends on the investment process. Investment and the supply of money are tightly coupled together, each affecting the other.

If the money were truly loaned, it would be like Clever Clancy loaning some of his stock of coins. For the coins to be loaned, the depositor of the coins has to be willing to do without their use. Therefore the loaning of the coins does not increase the money supply.

However the non-reserve fraction of money "loaned" by a bank is *created* and *issued*, as Tom created and issued his IOU to Jane in Chapter 10. Depositors are not required to do without the use of their deposits, and the total amount of money in circulation is increased. When the new money is issued, it carries an obligation to return equal value in real goods and services to the community. Thus the new money is a form of debt, as we also saw in Chapter 10. This way of "loaning" new money into existence increases the stock of money and therefore it increases the amount of debt carried by the community.

The derivatives and other instruments created by financial markets are instruments of debt. Reportedly the face value of such instruments reached $600 trillion in 2007, about ten years' worth of world production. Thus the financial markets and the shadow banking system create prodigious quantities of debt.

The parable of Trad in Chapter 9 is about investment in its purest form, without any involvement of money. Another parable, about Gadgets Inc. and Widgets Inc., will give us a look at how money can change the dynamics of investment, particularly if it is used in a way that maximises debt.

Gadgets and Widgets

Gadgets Inc. owns a factory that it wants to extend, because sales are good and it wants to increase its market share. Because it has had a good year it decides it can afford to use some of its profits (retained earnings, in the jargon) to pay for the extension. Gadgets thus manages to invest without going into debt. In this sense it is like the village of Trad: it has converted a surplus into new productive capacity. By avoiding debt, the firm minimises its exposure to problems in the financial system. If interest rates should rise, it will not be directly affected.

Contrast Gadgets with its rival Widgets Inc. Widgets Inc. was a rapidly growing newcomer that was beginning to threaten Gadgets by following the advice of hip young economists, who argued that Widgets could achieve greater growth by making smarter use of credit. By borrowing funds it effectively leveraged its savings so it could expand its factory faster than Gadgets. This worked well so long as the economy was steaming along. However inflation set in, interest rates jumped, business slowed and Widgets was in danger of bankruptcy because it couldn't afford its interest payments.

Gadgets Inc. is operating the way the capitalist myth suggests, namely by accumulating a surplus and investing it in new productive capacity. However modern economists are a little contemptuous of such virtuous practice, and prefer the way Widgets is operating. But then Widgets does go bankrupt. The economists shrug and call it a shake-out, the good old competitive market weeding out the weaker specimens.

Then things get really bad, in our story, because the economy has been booming for so long people think the good times can't end, and many firms have taken on a lot of debt. A chain reaction ensues: as firms like Widgets fail banks start to fail also, so credit and the money supply suddenly shrink. Unemployment rises rapidly, so many people don't have money to spend, and even Gadgets Inc. is struggling. People would like to be able to buy gadgets, and Gadgets would like to sell them, but there's not enough money. People would like jobs, but firms can't hire them because there's not enough money or credit. A full-blown depression takes hold.

This happened in the 1930s, in the 1890s, and many times before. In 1815, as the English King withdrew bank of England notes to repay his war debts, the resulting depression, it was said, created poverty amidst plenty. Productive farmland was available and there were displaced and idle people willing to work, but so little was happening that people were starving, and some resorted to harvesting wild nettle to try to survive. There was not enough money to allow the exchange economy to function properly.

The failure of some firms becomes a system-wide failure because the money supply is tied to "investment" loans. As debt-ridden enterprises fail, the banks lose money, until they have to use reserves, or fail themselves. Using reserves, or outright bank failure, causes the money supply to shrink rapidly, and that chokes off business for everyone. Then even well-run businesses performing routine activity can get into trouble. The

problem arises because in our banking system the supply of currency is piggy-backed on the investment process.

Let's pull apart the investment process a bit more, taking account of the involvement of both money and debt. Any investment involves risk. You invest wealth in hopes of generating more wealth than you invested, but not all investments work out. If you invest savings in an enterprise that doesn't work out, then you lose your savings. If your enterprise finished in debt, then your creditors lose some wealth through no fault of their own, but otherwise losses are confined to the people directly involved and there are no further repercussions. The rest of the economy carries on as usual.

However if you got a bank "loan", then the bank allowed you to issue a large amount of new money, thereby increasing the amount of debt in the world. If the investment goes bad, the bank has to cover the balance with its own funds. If a lot of its loans go bad, then the bank may have to dip into its reserve funds to make up the difference. (Let's assume, for clarity, that the bank operates under 10% fractional reserve requirements. The same principle applies to modern banking because it is also highly leveraged.). If the bank's reserves fall below the minimum it must hold for the total of the amounts it has loaned, then a serious problem emerges, because for every dollar by which it reduces its reserves it must reduce its portfolio of loans by about ten dollars. Because loans are the source of our money, the money supply is reduced by ten dollars. Thus the effect on the economy of a bad loan is magnified tenfold by this fractional reserve requirement. The reduction in money supply tends to slow economic activity and trigger other failures, so there is a chain reaction and this is a mechanism that feeds into recessions and depressions.

Debt is economic fire, powerful but potentially very destructive. Banks, which trade in debt, used to dress their ephemeral dealings in images of solidity: old bank buildings are massive stone affairs with thick columns and impressive porticos. Bankers presented an image of conservatism. There was, allegedly at least, something called "good banking practice". This involved always carefully assessing the risk associated with any loan, and avoiding excessive risk. Banking was the business of sober and responsible people. You wouldn't let children play with matches, would you?

During the nineteen eighties the financial system was deregulated. Banking became a more competitive industry. Banks' first responsibility is to their share holders, and as the financial markets were heated up by speculators, and rates of return increased, share-holders became more demanding. So banks became more adventurous, and began to join in the financial speculation. Evidently some of the children got hold of some matches. In one well-known episode, one of the young agents of Barings Bank's got a little carried away, lost billions of dollars and the Bank failed. Barings was the oldest merchant bank in London, founded in 1762. That escapade was later exceeded by another smart young agent of Societé Generale, France's second-largest bank. Bank practice followed bank architecture, which some time ago abandoned its heavy old forms and became a lot more hip.

By 2007 banks were engaged, along with the rest of the financial system, in the manufacture of incendiary devices. They developed complex derivatives that could be

traded on the market. Some enterprising incendiarists pushed mortgage loans onto people with poor credit ratings and little chance of repaying, and even onto people with no jobs. So long as the price of houses was rising, the loan would yield a profit even if no interest was paid. The mortgages were then sold on in derivative packages. However the complexity of the packaging didn't change the fact that the contents were rotten. Specifically, if the price of houses fell, they would lose money. The mortgage pushers sold the packages before their stench became too obvious, so passing the mess on to someone else. Of course the buyers should have sniffed more closely – after all, *homo economicus* acquires (and, by implication, digests) complete information before transacting.

The "instruments" of financial game-players all involve debt – as they would, because most financial trading is basically complicated gambling on what the market will do in the future. Credit-default swaps were supposed to be a safe bet, but the illusion of safety was based on past market behaviour. The behaviour of the market changed, because soon everyone was playing this new game. However the new game was designed to work when most people were still playing the old game. The clever but short-sighted designers of the new game didn't pursue the implication that if it worked soon everyone would want to play it. The result of all this clever greed was a world alight with debt.

The effect of the clever game-playing was to increase the disconnection between financial-markets and real-world values. The result was a boom with unrealistically high housing prices, followed by the subprime mortgage crisis, which led directly into the Wall Street meltdown of late 2008, a meltdown that quickly dwarfed the failures of Barings and Societé Generale. Frantic efforts by the US Government and the US Federal Reserve Bank dumped nearly a trillion dollars into the laps of the surviving Wall Street cowboys. The financial fall was halted, but the US economy is still struggling and in late 2011 unemployment is showing little sign of falling. However Wall Street has recovered completely, and is again making obscene profits. Unfortunately the potential for a depression cannot yet be discounted. Europe is struggling to avoid its own collapse, without ever coming to grips with the core problems. The masters have not repeated all of the mistakes that made things worse in the nineteen thirties, but neither have they made any but superficial reforms, so the potential for collapse remains.

Economists talk a lot about money and debt, but we have noted how limited is their grasp on the subject. The mainstream neoclassical models do not include money and debt. Nor do they include rapid change, because near-equilibrium models are not capable of rapid change. Consequently the mainstream economists and their models are blind to the recent giant debt bubble and its subsequent collapse. The theory of money circulation is so poorly developed that economic theorists, stuck in their static view of the world, could not even explain how a capitalist could borrow money and still make a profit from his investment[41]. Perhaps, like me initially, you find these claims to be surprising, even unbelievable. Therefore I offer a recent example of the limitations of mainstream modellers and then discuss some recent work demonstrating how much more insight is awaiting those who move beyond the distractions of neoclassical abstractions.

Keen[92] has drawn attention to a draft paper by prominent economists Gauti B. Eggertsson (New York Federal Reserve) and Paul Krugman (Nobel Laureate, New York Times columnist, and professor at Princeton University) that attempts to apply neoclassical equilibrium modelling to the Global Financial Crisis[93]. Keen gives a detailed critique, and only a few main points will be made here. (I would not normally comment on a pre-publication version of a professional paper, but Krugman posted it, and the fact that such prominent people would even contemplate the underlying approach that they extend slightly implies it is not unusual in the profession.)

Most basically, equilibrium models cannot follow the system through a bubble and crash. They have to make do with before-and-after models, even though there is not even any assurance that the real financial markets were anywhere near equilibrium either before or after the boom and crash.

Next, the models do not include money. Lacking money, the authors contrive obligations between "impatient" agents and "patient" agents, where what is borrowed is not money, but "risk-free bonds denominated in the consumption good", whatever that might mean. Perhaps it's their version of borrowing a cup of sugar from your neighbour. This division of agents into two kinds is apparently regarded in the profession as a great innovation. Almost all mainstream modelling is done in terms of a "representative agent", or equivalently by assuming everyone is in identical circumstances. This assumption of a representative agent imposes a severe restriction on what can be modelled, and it implies some absurdities such as that Bill Gates and a poor student would spend equal proportions of their incomes on pizza. It is one of the reasons why mainstream models do not include debt, because a debt has to be owed to a creditor. You need at least two kinds of agents.

Returning to the Eggertsson-Krugman model, they assume there is a ceiling on the amount that impatient agents can borrow and they contrive a crisis by lowering that limit for the second of their two equilibrium models. Such contrivances are not necessarily a bad thing, if the model is carefully posed to reasonably represent an observed aspect of the world. They might still be instructive in principle, if carefully interpreted, but in this case the models are so unrealistic that little useful is likely to be learned.

The models require a lot of sophisticated mathematics to solve the relevant equations, and they are evidently very clever in this sense. However the models also incorporate a patently artificial contrivance, the ceiling on borrowing. In the natural sciences, it is recognised that elaborate mathematical analysis is misplaced if rough artifices are used in a model, because the model will still only be a rough approximation. The danger, which neoclassical economics has been demonstrating for a century, is that the fancy mathematics will give the model the appearance of being more accurate and reliable than it really is.

Finally, the authors also reveal a fundamental misconception by stating "... the overall level of debt makes no difference to aggregate net worth – one person's liability is another person's asset." This is true in a barter economy, or in an economy that uses what I called commodity money in Chapter 10, i.e. money with intrinsic value. It would also be true if loans were made from savings of existing money. However in the real world, when banks

issue token money by creating it out of nothing and loaning it, the borrowers can spend it, thus contributing to the demand for goods and services. There is the formality of a book-keeping entry at the bank, which treats the borrower's debt as an asset of the bank, so in this sense the borrowers debt and the bank's asset balance each other, but both the debt and the asset are new, and increase the money supply and the level of debt. People can also fail to pay back the "loan", thus creating a problem for the bank. In other words what is called an "asset" is only a promise, and the promise may or may not be fulfilled. The insubstantial nature of bank "assets" is central to the dynamics of a boom and bust.

This leads us into some non-neoclassical thinking that yields a central insight. Figure 8.3 shows how private debt in Australia, as a percentage of GDP, has fluctuated dramatically over the past century or more. I noted there that in 2007 the increase in private debt amounted to nearly 20% of GDP, and that without that additional borrowing the economy would have been in severe recession. In effect, Australia was living on its credit card, something that most ordinary people can understand, even if neoclassical economists cannot.

Steve Keen, the author of Figure 8.3, defines aggregate demand to be the sum of GDP and the change in debt[63,94]. This just expresses in a different way what the last paragraph said. Aggregate demand, to an economist, is what people are willing and able to spend. Supply is the money it would take, at present prices, to buy all the goods and services available in an economy. The Gross Domestic Product, the GDP, is the total worth of all "final" goods and services produced. If inventories are not changing and some other conditions fulfilled then aggregate demand, in the conventional interpretation, is the same as GDP. Keen argues that if we borrow extra money then our demand is increased above this amount.

Now since 2007 Australia's debt, as a fraction of GDP, has levelled and even dropped a bit. This means we have not had as much to spend. Our economy would correspondingly slow. If we decided we were carrying too much debt and started repaying it, this would further reduce the amount of money that we could spend on goods and services, and the economy would slow more.

Table 12.1. The effect of borrowing and repaying on available money.

Year	Income	New Borrowing	Debt	Available funds
1	30,000	10,000	0	40,000
2	30,000	0	10,000	30,000
3	30,000	-10,000	0	20,000
4	30,000	0	0	30,000

A small example might make this clearer. Table 12.1 shows one person's funds for four successive years. Let's call her Jo Average. Jo has an after-tax salary of $30,000 per year. In Year 1 she borrows an extra $10,000. This means the money she can spend, her available funds, is increased to $40,000. In Year 2 she does not borrow any more money, so she only has her salary of $30,000 to spend, which is less than she could spend in Year 1. She is still carrying the debt of $10,000. In Year 3 she pays back the whole loan, so her "borrowing" for this year is negative: -$10,000. This has to come out of her salary, so she only has $20,000 available to spend. In Year 4 she has no borrowing and no more debt, so her available funds are her salary of $30,000.

Thus in the year Jo borrows, her "demand" increases. The next year she doesn't borrow any extra money, so her demand reverts to her salary. While she is paying back her loan in Year 3, her demand is reduced below her salary. Her demand returns to normal after her debt is repaid. This illustrates why demand is only affected by *changes* in her level of debt.

Now if Jo had borrowed the money from her friend Jill, then in Year 1 Jill would have less to spend, so total demand would not be affected. Jo would have more to spend but Jill would have less. Conversely when Jo pays Jill back, Jo has less but Jill has more. This is how economists seem to think about it: one person's debt is another person's asset and there is no net effect of lending and borrowing. However in the real world, Jo can get a personal loan from her bank, and the bank can create the money from nothing (or very little), so the total amount of money in circulation goes up. Whereas Jill had to do without her $10,000 until Jo repaid it, the bank is not doing without, and none of its depositors is doing without either. Thus by "loaning" new money created from nothing, the bank is increasing aggregate demand. Conversely as such loans are repaid, aggregate demand is reduced.

Economists call the process of paying down debt *de-leveraging*, and when many people and businesses are de-leveraging the economy will slow. When you are running up debt on your credit card you can spend a lot and feel prosperous, but when you set about paying off the debt you have run up you can't spend as much on things, and don't feel as prosperous. When the GFC hit, many people and businesses were forced to pay down their debt, and many others chose to. The result was a slowing of economies.

Returning to Australia's national picture, the way debt has changed as a fraction of total demand (GDP) is shown in Figure 12.1. Australia's debt-financed demand peaked around 20% of GDP in 2007 and then dropped to near zero, consistent with the levelling of total debt in Figure 8.1. Debt-financed demand in the US peaked even higher, near 30%, before falling to nearly -20%. In other words, not only did debt in the US cease to grow, it actually declined.

I have stressed that the debt-financed component of demand is the *change* in the total amount of debt. In other words only *net new debt* increases demand. You have to keep borrowing *more* money in order to keep spending more than you are earning. What is shown in Figure 12.1 shows how the debt-financed component changed, and our logic suggests that the big drops in debt would cause the economy to slow. If the economy

slows then typically unemployment goes up. This suggests that unemployment should correlate (negatively) with the change in debt.

Figure 12.1. The amount of available money (demand) due to increasing debt, as a percentage of GDP, for Australia and the US. From Keen.

Figure 12.2 shows the change in US debt plotted along with unemployment, which is inverted to show the relationship more clearly. It turns out the change in debt is an excellent predictor of the state of the economy, which is reflected in the unemployment rate. More comprehensive data show this more clearly than the small sample shown in Figure 12.2[94,95]. In fact this statistic is a more straightforward and more consistent predictor of the state of the economy than the usual indicators used by economists.

Although Figure 12.2 includes the official beginning and end of the US recession ("S" and "E"), these were determined by more complicated procedures that did not take account of levels of borrowing. Figure 12.2 shows there is an underlying cause and effect that is more direct, but to see it you have to take account of debt, which mainstream economists do not normally do in this context.

The failure to properly consider the role of debt in the state of the economy seems to be a major reason why mainstream economists did not see the debt bubble and therefore did not see the impending crash (though there were other signs that were also very clear, such as the ratio of house prices to median incomes). If economists missed around 20% of aggregate demand, how could they know what the economy was doing? They could not. And if so much of the debt that fed that aggregate demand was due to shonky "investment", then they were oblivious to the dangers of Wall Street's frenetic creation of debt through all their clever financial gambling instruments.

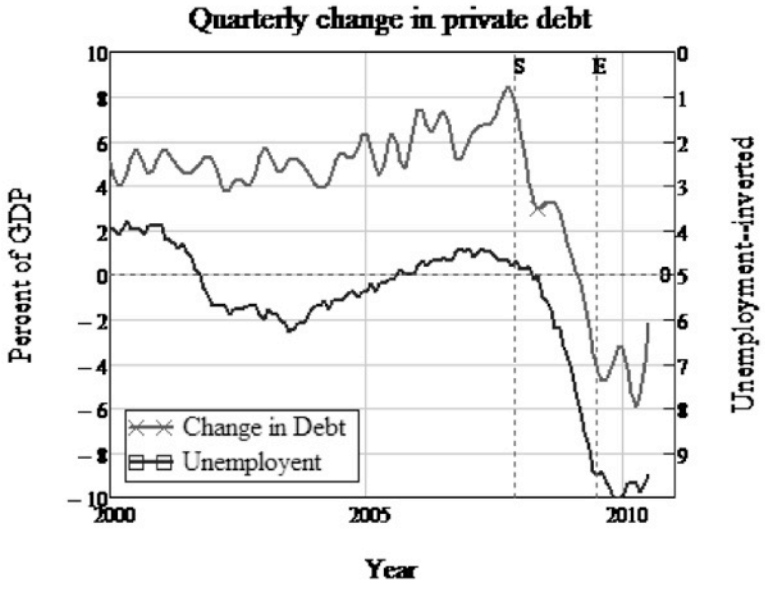


Figure 12.2. Comparison of unemployment in the US (lower curve) with the change in private debt (upper curve). "S" and "E" are the official start and end of the US recession. (The change in debt is per quarter, which is smaller than the annual change shown in Fig. 12.1.) From Keen[94].

Returning to the question posed at the beginning of this chapter, the reason failed investments affect the larger economy - the reason Wall Street affects Main Street so strongly - is that the money supply depends on investment. Most of the money we use originates in loans, and loans are given to buy houses, to set up or expand businesses and, in the shadow banking system, to gamble on the markets. All of this is conventionally called investment, even though much of it serves no useful purpose in the real, productive economy.

However the amount of money required by the routine economy bears no direct relation to the amount of money borrowed for investment, just as it bears no relationship with the rate of discovery of gold or with current fashions in personal adornment. Remember, from Chapter 9, the distinctions made between routine business, expansion of the means of production, and innovation. The latter two require investment, but the former, routine activity, merely needs a sufficient supply of currency in order to facilitate exchange.

It would be sensible, from the point of view of Main Street, to separate the supply of currency from the investment process. It is even possible to structure the currency supply system so as to minimise the amount required, without constricting routine economic activity. Any form of token money involves debt, as we saw in Chapter 10, so minimising the supply of currency would minimise that form of debt and the risk inevitably associated with it. All of this would be good for Main Street, and for most of us, because it would provide a much more stable and predictable environment in which to operate.

The catch with separating the supply of currency from the investment process is that it would require a major change in the investment process. It would arguably be a very positive change, but it would not be in the interests of most of the present financial industry. The financial industry is of course politically very powerful at present. That political power only exists, ultimately, because we allow it. Furthermore the financial industry is likely eventually to bring itself down, and that will create the political opportunity for reform, if we are prepared.

13. *Secure Investment*

The terms *investment* and *asset* are used much too loosely by the economics profession. Putting money into a highly-geared hedge fund that is betting on which way the market moves is not investment, it is speculation or, more prosaically, gambling. Although neoclassical economists claim that financial market activity serves to optimise the placement of capital into the most productive enterprises, in fact most of it is parasitic and destabilising, as we have seen in Chapter 7. The financial sector's proper role is to serve the real economy, the part that provides useful goods and services. Investment, properly speaking, is confined to putting money or resources into expanding or improving the real economy.

Similarly, an asset is something that provides useful goods or services. A house provides shelter. A machinery factory provides tractors to till the land. A loan in a bank's books is an asset to the bank, but it is an asset of a different nature. It can be called a financial asset if you like, but it is an asset whose value is not substantive, and is prone to diminishing or disappearing because it depends on the future turning out the way we hope and expect. It is only a promise, a potential asset.

In Chapter 7 we noted that the wild and destructive gyrations of the financial markets could be greatly reduced by imposing transaction taxes that take the profit out of short-term speculation. This would refocus the financial markets on longer-term wealth creation. It would allow managers of productive enterprises to focus more on medium-term creation of value instead of hedging against short-term fluctuations in share values and currency exchange rates. As a result the economy would be more efficient. It would tend to reduce the financial industry to a relatively small sector of the economy serving the real, productive economy.

Such a reform would be complemented and strengthened by shifting investment to lower-risk forms involving more use of savings and less use of borrowing. This also would tend to stabilise the economy, and therefore to enhance its efficiency.

Let us stand back from the technicalities of money and investment for a moment to recall the purpose of this book, which is to promote the creation of economies that serve people and the societies they choose to create. Efficiency, in the present regime, is associated with the relentless drive to produce more stuff and to discard employees who are deemed not useful. However efficiency can be used to accomplish what we choose to do in less time and with less effort. In other words it can enhance our quality of life, if we manage our economy to improve quality of life rather than to maximise the output of

stuff. The proposals here could work to make the present regime less inhumane, for example by avoiding or reducing sudden jumps in unemployment. However they can be part of a much bigger shift to an economy that is actually humane, rather than just less inhumane. In other words we can have an economy that serves people by providing quality of life and a thriving natural environment.

Investment can be undertaken with varying degrees of risk. The safest form is to use existing savings (your own or someone else's). This is how Gadgets Inc. financed its expansion, in the parable in Chapter 12. Ironically it is the way of the capitalist myth, though it is not the way much of the modern economy works. If savings are used the risk is confined largely to the investors. If the investment fails, the economy at large still continues business as usual.

A somewhat higher-risk practice is to use an existing asset as collateral for a loan. This is the normal way to borrow from a bank, familiar to many of us through home mortgage loans. Businesses may also use their assets to borrow in this way. However we should be clear that the security of using an asset to "secure" the loan belongs to the bank, not to the economy as a whole. From the bank's point of view it makes good sense to hold a claim over your asset as collateral against your loan. If you default on the loan, the bank sells your asset from under you and recovers its funds. If the economy is stable then the risk is mainly yours.

However if the economy is unstable your loss may spread more widely. The security, for the bank, of holding a claim over your asset will fail if asset prices are collapsing, or if market prices for your product are falling, because then it will not be able to recover the money loaned to you. The parable of Widgets Inc. illustrates the hazard of this form of investment. Widgets undertook a higher risk path that promised higher returns. It won for a while, but then lost when the economy turned bad. Similarly, part of the rationale for granting subprime mortgages was the assumption that house prices would continue to increase, so even if mortgagees could not repay the loan directly the increase in the house price would generate a return. When housing prices stopped increasing, this strategy failed. In this situation, the magnifier of banks' high leverage comes into play, and the failed loans, secured only by phantom housing prices, shrink the money supply and threaten to bring on a recession.

The highest-risk form of investment is borrowing against future income, in other words borrowing against assets that do not yet exist, but are anticipated. Tom's still-growing wheat crop from Chapter 10 would be a small example. Some new money (Tom's IOU) was created until the crop matured. New money created by banks, shadow and mainstream, constitute a similar bet on future income, on a much grander scale. Borrowing against future income comprises a substantial component of investment in the stock market. Some investors invest existing wealth, and the risk to the economy is low. However others obtain bank loans, for which new money and new debt is created, and total debt is increased. This creates the risk of a chain reaction of failures, each failure shrinking the money supply, and confidence, and causing more failures, as already described. This can lead to a stock market crash and recession. All the little debt fires

coalesce into a conflagration. This is what happened when the dot-com bubble burst. Many dot-com companies infamously yielded little or no income, they used rising market valuation to repay investors. When the market stopped rising they crashed.

High-risk borrowing against future income has become widespread. Australia has unprecedented levels of debt relative to GDP, twice what they were in 1928 and higher even than in 1890[72], as we saw in Chapter 8. The descents from each of those previous peaks were not gentle and orderly, they were market crashes leading into depressions. Much of the present debt is held by individuals, and much of it is for mortgage loans, which have been used to drive a housing price bubble that will inevitably burst. The subprime mortgage crisis in the United States was also a clear measure and symptom of excessive, and excessively risky, levels of debt.

The industrialised countries have by now accomplished what the industrial revolution promised. They have achieved high material production, sufficient to keep everyone in health and comfort. Yet they have not stopped there. They have continued to expand material production well beyond the reasonable needs of their people. Yet they have not eliminated poverty and hardship, because the material benefits of production are diverted by various mechanisms to the already-wealthy. The continued growth of these economies is not eliminating poverty, it is merely enhancing the wealth of the wealthy, as is documented in Chapter 2.

This greed-driven growth regime is degrading society and seriously damaging the Earth. It therefore makes no sense to continue to use high-risk investment practices in order, allegedly, to maximise short-term growth rates. We can afford to shift to lower-risk practices. In fact we must, to avoid imminent economic and social collapse due to the failure of essential processes of the natural world. We can choose to do this anyway, as part of our shift to economies that yield more quality with less quantity, so they can sustain us perennially.

We should note that there is a powerful political reason that also drives unnecessarily high growth rates. In our present system, if growth of the GDP slows then unemployment goes up - but only temporarily. As noted in Chapter 2, doubling or tripling GDP over recent decades has not reduced unemployment, in fact unemployment is considerably higher. The lesson cowardly politicians take is to never let GDP growth slow on their watch. The proper lesson is that if we slow GDP growth then we should provide appropriate transitional supports for any people who lose employment, until things settle down.

In the longer run we could, for example, reduce working hours, so there would be more people required. We could then have low unemployment and more time for ourselves. This will be decried as a fantasy by neoliberals. However working hours in Australia have increased dramatically over the past two decades, so we would only be returning to what was quite acceptable until recently. Also, they seem to be able to do it in Sweden. Sweden's economy contracted just as much as Spain's during the GFC, yet Sweden's unemployment rate is a few percent compared with Spain's 20%. Germany also kept unemployment relatively low as it weathered the GFC.

Returning to the discussion of secure forms of investment, much of the risk to the economy due to borrowing against future income can be eliminated by shifting to a savings and investment regime. The stream of money that goes to pay interest at present could instead be flowing into savings, and thence into investment. Instead of borrowing from the future and leaving a burden on our children, we would be saving from the past and leaving a gift to our children. Ironically China, still a relatively poor country, has far greater savings than Western nations, which it is using to buy Western assets. China's example shows it is quite possible to achieve rapid development using savings rather than debt.

The transition from borrowing to saving would require a period of paying down our debts, which would mean a more restrained lifestyle. Alternatively we might declare a partial or full debt jubilee, in which old debts are forgiven. This would hurt financiers, but they have been profiting from others' pain for a long time and they could well bear some of the pain of adjustment themselves for a change. If we had not been so profligate such adjustments would not be necessary. Since we didn't restrain our profligacy, our lifestyle will in any case soon be restrained more brutally.

In poorer countries there may be a case for borrowing against future income. First of all, being poor, they don't have much savings to invest. Second, the debt regime they have been enmeshed in, overseen by the World Bank and the International Monetary Fund, has been serving them very poorly.

Not only has GDP growth in poor countries been slow, especially over the past quarter-century as we saw in Chapter 2, but their sovereignty has been compromised. Domestically they have been forced by the IMF to adopt harsh neoliberal policies that have driven inequality to greater extremes. Those countries that were inveigled into debt prior to the oil crisis in the nineteen seventies saw interest rates and their debt levels soar through no fault of their own. The loans and other "aid" that is provided often comes with strings attached, a common one being that goods must be purchased from US corporations.

The one-size-fits-all neoliberal economic prescription is that poor countries sell commodities so they can import equipment and technology. As a result of the extra production, commodity prices fell dramatically. As well, domestic economies were distorted to pay international debt and earn foreign exchange. Since local technological expertise has often been lacking, they have become dependent on foreign experts. Lack of local institutions, inexperience and the injection of large amounts of money have, unsurprisingly, promoted corruption in many places. (We should bear in mind, before we judge them too harshly, that financial deregulation in the West has also promoted amazing levels of malfeasance.)

The South American countries have suffered some of the worst experiences of the present regime, capped by Argentina's total economic collapse in 2001, as was recounted in Chapter 2. Recently they have been leading the way in extricating themselves from the toxic World-Bank-IMF regime, electing leaders who paid off the foreign debts and adopting policies aimed more at helping the common people than enriching elites[17].

Perhaps there is no need for foreign borrowings at all. Even if a country borrows from the World Bank, it still has to issue loans in local currency to give effect to the international loan. In cases where local needs, materials and labour match, local banks can just issue local currency through a loan, with no involvement of foreign money and no requirement to pay interest to foreigners or to repay expensive foreign currency. Such self-reliant local development is preferable anyway, even if it is slower, because local talent, experience and institutions can be developed at the same time. The local loans would have the disadvantage of being secured by projected future income, but so are those that originate internationally.

Another way to handle risk, suitable for larger loans, is to insure the loans, appropriately bundled. Turnbull[96] proposes separating credit risks from liquidity risks. Liquidity, in the jargon, is the availability of cash for short-term needs. A project that has a good chance of being viable in the long term might still fail because of a short-term failure of cash flow. Credit risks would be covered by insurance companies that hold assets (equity) rather than debt. Liquidity risks would be managed by banks, that can carry larger debt to equity ratios. The credit insurance would replace the interest-rate premium normally charged on higher-risk loans, so the total cost would be comparable. An important advantage of separating the insurance component is to preserve the local autonomy of the lenders and borrowers. It might be reasonable to use foreign insurers, on condition they do not gain control over the loans process.

However there has to be an obvious caution on the use of this approach, because crude debt "insurance" was misused by Wall Street cowboys (in the form of credit default swaps), and it played a large role in the Global Financial Crisis, including the failure of insurance giant AIG Inc. Proper insurance involves keeping a reserve that can cover losses. Tight regulation, limiting the amount insured and restricting the complexity and opacity of financial "products", would be necessary to prevent the benefits being gambled away. Also, if this approach were confined to poorer countries it need not comprise a large segment of global finance and so ought to be quite manageable.

By such means poor countries (and local communities anywhere) could use self-financing to promote indigenous growth of local economies. Such indigenous growth is much the best way to avoid dependence on large and distant institutions, on one-size-fits-all prescriptions, on the treacherous global trading regime, on foreign experts and on foreigners generally. Only through the indigenous growth of all the knowledge, skills and institutions involved with economic growth can a society become properly self-supporting and autonomous, and thus able to foster its people's full potential. As Beinhocker emphasises[39], knowledge, skills and institutions must *coevolve* if societies are to improve their quality of life.

The very poorest people are the ones who most need to be able to invest in their own livelihood, but the banking system has a strong bias towards loaning to the already-wealthy. Banks will loan the money to buy a house to ordinary people in return for a claim over ownership of the house. However they are more reluctant to loan someone money to set up a business unless the person has a track record in business or can offer an

asset as security. The employee-ownership trusts discussed in Chapter 9 are one creative counter to this bias. In effect they use the assets and future income of a functioning business to secure a loan for the employees.

A creative solution to the difficulty the non-wealthy have in obtaining credit was developed by Muhammad Yunus, working among the poorest villagers of Bangladesh[97]. His system has become known as microcredit and has been adopted widely as an effective way to combat poverty and the dispossession that commonly underlies it. In Yunus' Grameen Bank system, loans are made to groups of five people, usually women, who must agree to cover each other's share of the debt. In this way he harnessed the social strength of local communities, because people would only form a group with others they trusted. The default rate has been lower than for many commercial banks. The loans are small, enough to buy a cow or a hand loom and materials, but the program has had some success in restoring self-sufficiency and dignity to some of the poorest people.

The microcredit approach has been adapted to poor neighbourhoods in first-world countries. For example, one promising approach was developed by the South Shore Bank in Chicago[98]. This bank focussed its loans on poor, decaying neighbourhoods, mainly for mortgage and construction to rehabilitate run-down buildings. Like the Grameen Bank, South Shore not only proved lower-income people to be creditworthy, but it worked diligently with them in their neighbourhoods to ensure business success. Its default ratio has been low to normal, its success in rejuvenating neighbourhoods nearly legendary. By making local loans to local people and businesses, the South Shore Bank has drawn on people's commitment to their neighbourhood and thereby rejuvenated the local business ecology.

Some controversy has developed around the microcredit approach. It is said by some that it has failed, because it is used too simplistically as a panacea by some governments, and because it neglects social factors that are at least as important in perpetuating poverty as short-term lack of funds[99]. Evidently it has been seized upon by neoliberals as a demonstration and vindication of the power of "capitalism" to lift people out of poverty, and of course neoliberals neglect the importance of social context. Also it has been simplistically co-opted by some big financial institutions that loan only to the not-so-poor, and that impose onerous conditions. As a result people are being lured into debt from which it is hard to escape. On the other hand when it is used in a way that is sensitive to local culture it can be beneficial[100].

A recurring point in this book is that there are many mechanisms that divert wealth away from the poor and that harm the environment that the poor are often more directly dependent on. Any of the reforms proposed in this book, implemented in isolation, will be subverted and their potential limited while these larger mechanisms are allowed persist. As well, microfinance might benefit greatly from the alternative monetary systems discussed in the next chapter.

14. *Sound Money*

Although money is a powerful invention, the world has struggled to find forms of money that facilitate exchange without greatly distorting the exchange process. The Mutual Credit Union briefly introduced at the end of Chapter 10 has important virtues that we will look at here. First, however, it is useful to briefly review the merits and problems of previous and existing systems, because discussion of the subject is beset by many misunderstandings and by strongly-held views.

Commodity money, items that have their own intrinsic value, are usually quite limited in usefulness because of the properties of the commodity used. Livestock are useful for village-level exchange but not for larger societies. Tobacco, widely used in the early history of the US, is more portable and divisible, but limited in the quantities that can be conveniently traded, subject to decay and, most importantly, its supply is subject to the vagaries of production that are not closely related to the need for exchange. Grain, widely and fairly successfully used in ancient times, can facilitate moderate levels of exchange, but it tends to decay in storage. Although the supply of grain is also not closely related to the need for exchange, it is such a common, abundant and valued commodity that supply is less of a concern. However the quantities that can be conveniently traded are limited.

Precious metals and other items valued for their adornment value, rarity or beauty, have been widely used as money, and they have the important virtue of being compact, portable and reasonably divisible. However there have been persistent problems of supply, which tends to vary capriciously with little relation to the need for exchange. Thus shortages have depressed economic activity and excesses have triggered inflation.

Gold, and to a lesser extent silver, has attracted passionate advocates over a long time. Presumably this is because gold is widely perceived to be valuable and because it seems to be very substantive, especially in contrast to paper money, whose substance and value both seem to be ephemeral. However the value of gold is not based on its usefulness. It does have important uses in modern technology, but these are recent innovations and they would not by themselves support the perceived value of gold. Rather, the value of gold is highly subjective. At one extreme are the native Americans of the Black Hills region, who called gold “the metal that makes white men crazy”. More broadly, the desirability of gold is subject to its own vagaries of subjectivity, fashion, and speculation. For example, the dollar value of gold has fluctuated by about a factor of three over recent decades. Such vagaries are in addition to the vagaries of supply. Thus gold is still far from ideal as a medium of exchange.

The ancient Egyptians made an important innovation with the use of clay receipts for stored grain as a form of money[83,89]. The receipts stood as tokens of the grain stored in

official warehouses, and thus were a *backed currency*, in the terminology of Chapter 10. They were far more portable than the grain for which they stood, and thus they overcame an important limitation of grain-money. The tokens also lost value with time, because the stored grain would degrade with time, and this feature introduces an important property that we will pick up a little later.

There are passionate advocates for a return to the so-called *gold standard*, meaning the fixing of the value of paper money relative to the value of gold. This concept grew out of the early use of paper money backed by stored valuables, which thus comprised a backed currency. The parable of Honest Abe in Chapter 11 is an example. There have been times when official currencies also featured the ability, in principle, to exchange paper money for equivalent value in gold, but it has been a long time since national authorities would actually exchange your paper notes for gold. Anyway the gold itself is not an ideal form of money, as we have seen.

The dominant system at present features token money whose quantity is highly leveraged from banks' financial assets. Although much of the modern banking system is not strictly a fractional reserve system, its money is still correctly described as *fractionally-backed currency*. Because the backing fraction is small (less than 10%), the leveraging is high (greater than a factor of 10) and this makes this currency potentially highly destabilising. It is prone to a sudden loss of trust, so that its value may suddenly drop, or evaporate completely. Thus our present system still incorporates one of the worst features of the old money-changers' deceit, namely their fractional backing of paper notes, as exemplified by Slick Slim in the parable of Chapter 11.

A second major problem with the present system is that new money is issued in the form of loans. This ties the supply of money to the vagaries of investment. Given the modern propensities for high-risk investment, for speculative gambling and for outright fraud, in the form of overt or implicit Ponzi schemes, our money supply is further destabilised, and also held hostage by unscrupulous manipulators.

A third problem with the present system is the charging of interest on money. This occurs because the money is issued in the form of loans on which interest is due. There are several problems with interest. One is that charging interest creates an incentive to increase the money supply, which tends to feed inflation, because banks derive their main income from loans[41]. Because token money is a form of debt, an increase in the money supply also increases the level of debt carried by society. Thus charging interest increases the risk to our money and our economy, which makes it indirectly destabilising. A second problem with charging interest, which may be surprising, is that charging interest is a market failure. Possibly for this reason the charging of interest has been proscribed as immoral at various times and places. This aspect of interest deserves some further examination, which we will give it shortly.

Before looking at interest, there is one other important feature of historical systems to note. The stamp scrip in Wörgl was described as *shrinking money*, because the monthly fee in effect reduces its value to whoever is holding it at the end of the month. The grain tokens of ancient Egypt also lost value with time, reflecting the degradation of the stored grain they represented, so they were also a form of shrinking money. Another system

developed in the Middle Ages, when feudal lords withdrew coins from circulation and diluted them with cheaper metal[83]. This was a form of taxation, but it also meant the value of the coins decreased with time, so they were also shrinking money.

Shrinking money encourages holders to spend it as soon as possible, before it loses too much value. There is thus an incentive to keep shrinking money in circulation, in other words to use it as a medium of exchange. There is a disincentive to hold it or hoard it. Hoarding, or saving, should be part of the investment process, so the shrinking of shrinking money tends to keep the supply of a medium of exchange separate from the investment process.

Charging interest creates a market failure, and the resulting unfairness has led, in the past, to moral injunctions against it. The charging of interest is proscribed by Islam, and in some circumstances by Judaism. It used to be proscribed in Christianity as well. The unfairness arises because lenders who charge interest get the benefit of investment without sharing any risk. Neither do lenders have to work for the investment income. Conversely borrowers are bound to an inflexible requirement that takes no account of the risks of investment nor of the vagaries of life. The arrangement is unbalanced. The least that can be demanded of lenders is that they share the potential risks of investment as well as the potential benefits. This can be accomplished by replacing interest with a share of profits – or losses – as is the case if you buy shares in a company.

Referring back to the essence of investment, covered in Chapter 9 and Chapter 13, someone who has accumulated a surplus of wealth can convert it into more productive capacity, and gain extra income from that conversion. Proscribing interest is not contrary to that principle, because investment is still possible without interest being charged. Islam, for example, does not proscribe gaining income from an investment, it proscribes fixed interest as the means of gaining that income. What is at issue is the contract between lender and borrower. By charging a fixed interest rate (or an interest rate determined by an extraneous factor like managing the money supply), the lender is getting a completely free ride. They don't have to work for the income and they don't have to bear any risk. On the other hand the borrower is bound to provide a steady stream of wealth to the lender regardless of what happens in their enterprise or their life.

The avoidance of risk by lenders is not only unfair, it is a market failure. In the conventional jargon, capital will only be allocated efficiently if both earning capacity and risk are properly assessed in investment decisions. When investors are able to avoid risk, or fail properly to assess it, wealth may be dissipated on unproductive schemes. The subprime mortgage crisis in the US is only the latest example of this kind of market failure.

According to Mohammad Yunus[97], extreme poverty in Bangladesh almost invariably comes about through a poor family being forced into debt by a misfortune like illness. It is often difficult for them to make repayments, and if they fail they may lose their land and livelihood to the lender. They may then become debt slaves, working for the lender to pay an unpayable debt. In developed countries we have some protection through bankruptcy procedures. Unfortunately protections are few and loan sharks are plentiful in many poor

societies. The same is true in the international environment: many poor countries are effectively in debt slavery to wealthy Western lenders.

Proscribing the charging of interest might seem to discourage savings, especially by small family savers, and to require families to expose themselves to the vagaries of the share market. However if the financial markets were stabilised, through the kind of policies proposed in Chapters 5 and 13, then risks would be reduced. As well the benefit of investing would be greater because stable markets would make the economy more efficient. Anyway most people's biggest savings are not in savings accounts but in retirement funds, most of which are invested through the financial markets. Only a small portion of saving is done through safe and reliable savings accounts, but even term-limited savings accounts attract only modest interest returns.

Most interest payments flow not to small savers but to the big money lenders. Small savers typically pay, directly or indirectly, far more interest than they receive. A major reason is that most of our money is "loaned" into existence with interest due, so it accumulates interest so long as it exists. Because we need money for exchange, we can't pay off all the loans, so interest is accumulating all the time, like a hidden tax payable to the private banks. The result is a major transfer of wealth from most of us to those wealthy enough to own a lot of shares in financial companies, as Figure 14.1 illustrates. Thus the charging of interest comprises another mechanism pumping money from the poor and middle class to the rich, and proscribing interest would provide a net benefit to the non-wealthy.

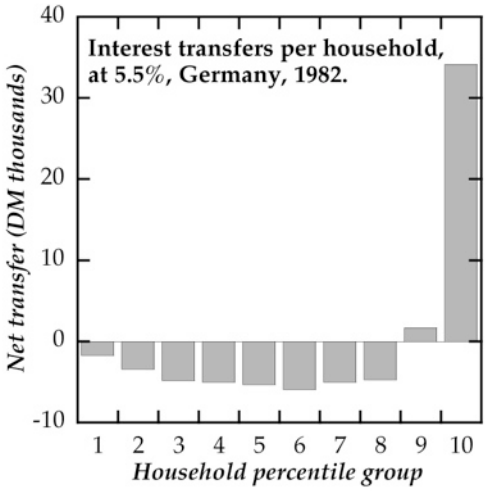


Figure 14.1. Net transfers among income groups, in thousands of Deutschmark per household[83]. Household incomes are grouped by every ten percentiles, i.e. by decile. Households in the middle income range paid around 5,000 DM net in interest, whereas household in the top decile received about 34,000 DM. Charging interest on new money pumps wealth from the poor and middle class to the most wealthy.

There is thus a strong case for abolishing the charging of interest and replacing it with investment dividends, and fees for service: fees can be charged for the service of providing currency, as in the Community Bank example discussed in Chapter 10. We will shortly explore this further. The existing process of investment already offers the appropriate alternative structure, wherein investors share profits, risks and losses, although it needs to be stabilised and separated from the provision of currency.

Now let us consider some monetary systems that avoid some or all of the problems reviewed above. There are two broad categories to consider: centralised issue of money and decentralised issue. *Fiat money* is not necessarily issued centrally, but its value is the subject of government regulations, usually by a law designating it as legal tender (meaning it must be accepted in payment), so in this sense its value is determined or affected centrally. Although in the present dominant system much of our money is issued by banks, their power to do so is delegated from a central bank. Thus it is actually a highly centralised system, as the national setting of interest rates by central banks demonstrates. On the other hand the stamp scrip issued in Wörgl was issued by local authorities, so it is an example of decentralised issue.

Central issue of money may be done by banks or by governments. Central banks these days commonly have a degree of autonomy from governments, so that governments typically do not directly issue money. Governments seem to have inherited and continued the practice of the English king at the time the Bank of England was founded. Recall that the king borrowed gold and paper notes from London money-lenders, with interest due. Evidently the king did not realise he could have issued the paper notes himself, and most modern governments seem to be no smarter.

Most modern governments issue bonds which are "purchased" by the central bank. This amounts to borrowing money from the central bank, because the bond just says the government owes the bearer some money, plus interest. The central bank creates new money out of nothing to "purchase" the bonds, thus supplying the government with money. Thus the central bank did not have to exert itself to earn any money, it just had to create a new computer account. That is why I put "purchase" in quotes. The effect is that new money is issued by the central bank, and the government pays the central bank interest, though the government could issue the money itself and avoid the interest payment, which of course is paid by taxpayers. Again there is an unnecessary transfer of wealth from most of us to a few of the wealthy.

Abraham Lincoln was smart enough to realise that if banks could issue currency then so could the government, and he did so during the Civil War. As Thomas Edison observed later "If the Government can issue a dollar bond, it can issue a dollar bill". Lincoln's notes came to be known as *greenbacks*, which his government issued into circulation by using them to pay for services.

There was no fee on Lincoln's greenbacks. No interest was charged for their use. Lincoln considered it the government's role to provide a stable currency for the citizenry. Some governments still issue cash (notes and coins) directly with no interest burden, though cash is a small fraction of the total money supply.

Lincoln's greenbacks and government-issued cash were or are issued independently of loans, and therefore independently of the investment process. Their value is not leveraged from a reserve fund or other assets, it derives ultimately from trust that the government will always pay its debts. Thus the value of Lincoln's money arises in the same way as the value of Tom's IOU in Chapter 10, from community trust. Such money therefore avoids the three major problems identified above: it is not burdened by interest, its supply is not dependent on the investment process, and its value is not leveraged from a smaller asset.

There is no reason governments cannot issue money this way. Reportedly the British Government did so during World War I. Lincoln actually had plans to permanently supply money to his citizens in this way, and in 1865 he issued a policy paper to that effect. It concludes "Money will cease to be the master and become the servant of humanity. Democracy will rise superior to the money power."[101] However five weeks later he was assassinated.

Although the direct issue of money by a government could be a big improvement over our present problem-plagued system, it would still encounter one main difficulty. It is hard for a government to know how much money is required for exchange, and therefore how the supply of money would need to change from year to year.

Oddly enough the direct regulation of the money supply by government was advocated by Milton Friedman, one of the neoliberal gurus of free markets and the minimisation of government power. Friedman's theory became known as monetarism, and the US Government actually tried to implement it in the 1980s. However it was a failure, not so much because it was hard to predict the amount of money required, but because the government could not actually control the amount of money in circulation. Monetarists assumed that the government can control the amount of money by controlling the reserve fraction and the interest rate. However Keen[91] and others argue that money is created beyond the reserve limits and reserve amounts are then adjusted to accommodate it, as was discussed in Chapter 11.

A better system would be one in which the quantity of money self-regulated according to the need for exchange. Such systems have been devised, and implemented on small scales. The basic principles were devised by Silvio Gessell early in the twentieth century[102]. Wörgl's stamp scrip money was based on Gessell's ideas, though it did not incorporate all features. Since then local currencies of various kinds have sprung up[82,88], and experience with those has led people back to Gessell's ideas, and extended them to some degree.

A key principle is that a currency should be intended as a medium of exchange, and should be decoupled from the investment process. Savings and investment can still proceed, as will be elaborated below, but investment should not affect the supply of currency. Thus routine economic activity can be maintained independently of the vagaries of the investment process.

Chapter 10 developed the idea of split barter, and illustrated in rudimentary form how it could be implemented by a Community Bank (Figure 10.5). A system called a Mutual

Credit Union (MCU) has been developed from these ideas, and from experience with local currencies of various kinds[82,83,88].

A mutual credit union charges a percentage fee on *both* credit and debit balances[82]. The fee on a debit balance is (partly) analogous to an interest charge in our dominant system. The fee on a credit balance is similar to the stamp fee on Wörgl's stamp scrip. This fee structure serves several purposes. It covers the cost of the service of providing a medium of exchange. The fee on debit balances discourages debt. The fee on credit balances discourages hoarding the currency and helps to keep the money circulating rapidly. If you want to save, there are better ways, as we will see below. The fees in mutual credit unions are fairly large, comparable to credit card fees, and this encourages you to keep your balances small. In this way the MCU tends to minimise the amount of currency in circulation and thus minimises the associated debt.

Despite relatively high fees, the MCU system need not cost users much. This is because fees can be minimised by minimising your account balance, just as you can avoid large interest payments on your credit card by paying it off quickly. If, in practice, MCUs did have a significant incentive to issue extra money, then further disincentives could be designed. However the problem would be far smaller and easier to manage than in the present system. Thus the fees need not become an income transfer mechanism from poor to rich. The point of the fees is not to enrich "lenders" by disguising the issuing of money as the granting of a loan. The point of the fees is to pay for the service provided, so it does not involve the market failure, and moral objection, of charging interest. Real-world experience would come to determine the magnitude of the fees, and reasonable fees would be assured if there was some competition among different MCUs.

Although fees would discourage withdrawing large quantities of currency, there would be a need also to have limits on account balances, as there are for existing credit cards. An alternative or intermediate approach might be to charge fees on a sliding scale, with larger percentages on larger balances. Again real-world experience would determine practical mixes of fees and limits.

The fees and limits would serve to keep the MCU currency from being used for significant investments. You would not borrow at the high interest rate of your credit card to finance a new shop. There are better ways to finance investments, as we will soon see.

The fees on credit balances may seem strange, because we are used to being paid interest on credit balances. As noted already, if you want to save, and to receive income from your savings, then the savings mechanism soon to be discussed will serve better. The fee structure of the MCU means its currency is *shrinking money*. The longer you hold the money, either in your wallet or as a credit balance in your account, the more you pay, so in effect the money loses value at a steady rate, as did the stamp scrip in Wörgl. The money is intended to facilitate exchange, and this feature encourages you to spend it so it can fulfil that role.

It is an interesting question whether a system like this would allow inflation. Unlike present banks, the MCU would have less incentive to increase the supply of money, and therefore the level of debt, so in this respect it would be less inflationary. Practical experience would determine whether additional limitations or regulations might be

desirable to ensure that MCUs did not promote unnecessary money supply. If necessary they could be required to operate as non-profit businesses to keep their focus on the provision of service rather than on making profits.

So how would you use the MCU money? You would use it in the way Tom, Dick, Harry and Jane use it in the illustration of Figure 10.5. Tom wants one of Harry's pigs. If he doesn't have enough money he withdraws some from his account with MCU and pays Harry for the pig. Harry then uses the money he has earned from the sale of the pig to buy some potatoes from Dick. Jane wants some of Tom's wheat, so when the wheat is ready she pays him for some wheat. Tom then deposits Jane's money in his account. If the amount he deposits should be the same as the amount he withdrew, his balance would then be zero. This would be good, because then Tom would not be charged any fee. It is not a problem for Tom to have a zero balance, because he can withdraw more money at any time if he needs it, just as you can withdraw money with your credit card as you need it.

Meanwhile Dick might be holding money that he doesn't want to spend yet. Rather than risk it being stolen he might deposit it with the MCU for safe keeping, and the MCU will charge a fee for that service. If Dick accumulates a significant amount of money he might be better off to *invest* it, so he gets a return on the money instead of paying a fee on it. We can now look at how savings and investment might work in conjunction with an MCU system.

Systems with shrinking money throw the issue of savings into high relief. You would not try to save shrinking money. Yet the mythical capitalist process is to accumulate (save) wealth so it can be invested in new productive capacity. It may seem that you can't save in a system with shrinking money. However there's a straightforward way to save: you exchange your savings money for something of *real present value* whose value does not shrink. For example, you could buy diamonds and put them under your mattress. This would allow you to store value while returning the currency to circulation, to fulfil its function as a medium of exchange. More generally and less facetiously, you could buy anything that other people value, like shares, real estate, art, or imperishable commodities like gold or diamonds, to store your wealth.

A bank could also do these things for you, by offering a savings account, on the understanding that any money deposited would be exchanged for things of real present value, and that you could at some future time ask for them to be exchanged back into money so you can pay for your new shop or factory (or whatever). You could call the account an investment account if that seems more appropriate. We might define a new institution, separate from MCU, called Community Investment Bank. It would, however, function rather differently from the so-called investment banks that helped to bring on the GFC. The CIB might choose to have a portfolio of investments that included shares, real estate, etc. to service the savings accounts of customers. This is in fact how banks already handle a savings account in the present system.

Although we tend to think of saving "money", it is clear in this example that it is not really money that is saved, even though the value of your saved wealth is measured by its

dollar value. The role of the money in this example is still to be a medium of exchange, not a store of wealth as some might claim. This is clear because it functions to convert your surplus wealth from tokens into things of real present value, and back. Thus it is quite possible to have a savings and investment system in conjunction with shrinking money, even though at first sight shrinking money might seem to preclude or discourage savings.

A crucial point here is that this system, MCU plus CIB, minimises debt. There is no debt at all involved in the savings and investment process. There is some debt involved with money, as we have seen with Tom's IOU, but the system minimises the amount of money involved. You don't accumulate much money in your "savings" account. Instead the money is exchanged for other forms of wealth (real present value) and thereby returned to circulation. The things you purchase to be a store of value, the things you invest in, involve no debt, they are not promises of future value, they have real present value. The role of the money is to be a medium of exchange, and it is not a medium for storing value. Scrooge McDuck might have a big vault full of money he likes to swim in, but that's not the way wealth is accumulated in this system.

Nor are most savings kept in the form of money in our present system. Our banks handle savings pretty much as they were just described in the shrinking-money system. They take the money you deposit and invest it, keeping a little money on hand for those who want to withdraw money. By investing your savings, the bank converts them from token money into something (hopefully) of real present value, and the money is returned to circulation. That part of our system is similar to the shrinking-money system.

Where real-world banking differs is that money is created through "loans", and because the "loans" involve new money they increase debt. This brings about two crucial differences: the supply of money is dependent on the investment process, and the investment process is done with debt rather than with savings. A third important difference is that banks have a strong incentive to promote the issuing of loans and new money.

Money and the role it plays in the economy have been the subject of the last several chapters, so it is useful to review what has been covered. The real-world example of the stamp-scrip money used in Wörgl demonstrated that a different kind of money could have a dramatic and positive effect on the society in which it was issued. It also led us to better understand the roles of money, savings, debt and investment.

The fundamental role of money is to facilitate exchange. The most convenient form of money is token money, meaning money that has no intrinsic value of its own. Token money is, in effect, a contract between buyer and seller, the buyer (the offerer of the tokens) implicitly agreeing to return equal value in goods or services to the community.

When understood in these terms, the provision of a medium of exchange can be seen as quite different from investment. Yet in our present system supplying money and facilitating investment are thoroughly entangled, because money is supplied as "loans" in our highly-leveraged monetary system. The problem with this entanglement is that the

leveraging magnifies fluctuations in the money supply. Failures of investments can then lead to an exaggerated reduction in the money supply and thus rebound on the whole economy, rather than just on those investing.

The supply of currency can instead be accomplished through the operation of demand accounts that would function like credit cards or lines of credit. The service would be paid for by appropriate fees. There are good arguments for fees to apply to both debit and credit balances, so as to speed circulation and discourage hoarding. Such fees would probably also tend to discourage inflation. The costs to clients need not be large, because they are encouraged to keep their balances small (and banks would be discouraged from promoting larger balances). Despite very high interest rates on credit cards, many people avoid fees by paying them off promptly and keeping their balance low. Savings can be accomplished by converting "saved" money into things of real present value, on the understanding that they can be converted back into money when required.

The purpose of investment, on the other hand, is to convert accumulated wealth into additional means of production, as implied in the capitalist myth. The form of investment that carries the least risk to the larger economy is the use of accumulated wealth, equity investment in present jargon. In this mode, the investor still carries the risk that the investment might fail, but the economy is not put at risk. The next safest is a loan secured by collateral. Such a loan increases the money supply by "monetising an asset", though the money is backed in principle by real value. However that value could evaporate in an economic contraction. The least safe form of investment is through a loan of new money secured only by future income. Such loans increase the money supply and entangle the money supply with investment, and thus put the whole economy at risk. Such loans should not become a large proportion of investment. However there are good arguments for such unsecured loans to be relied on more in poor countries (or poor neighbourhoods) in conjunction with appropriate and carefully regulated risk insurance.

The example of Wörgl offers us a fundamental lesson: the town was in depression because of a shortage of currency. When the mayor provided his people with some currency to facilitate the things they wanted to do anyway, they were able to go ahead and do them. The stamp scrip was particularly effective in this role because it circulated more rapidly than the national currency, so it facilitated relatively more economic activity. The provision of sound money is of critical importance to the establishment of a healthy and stable economy.

The financial sector has been extremely powerful, and until recently it would have been difficult to introduce substantial reform. Taoist wisdom says there are times for action and times for contemplation. As I began this writing it was still a time for contemplation, and preparation. A serious financial collapse has since ensued, the power of the financial sector has been reduced a little, and the interest of the population in reform has increased. The system has been propped up for the time being, but it is still unstable and a larger collapse is all too plausible. Should that come to pass, the power of the financial sector would be substantially reduced and pressure for serious reform would increase. We would then be poised on the cusp of a choice: to recreate the system in its

old form or to move to a new form that might be more stable and less exploitive. It would be a time for action.

Part 5: Pulling in the Same Direction

It is perhaps a wonder our economies function even to the degree they do, and it is no wonder they are erratic, highly inefficient and generate extremes of poverty and wealth. Stabilised, made more coherent, and with the goal of wellbeing rather than ever-greater quantities of stuff, they could improve everyone's quality of life without destroying the natural world, our life support system.

The materialism, selfishness and competitiveness that are assumed at the core of mainstream economic theory have other expressions in our societies, through our politics, media, marketing and governance, and they have weakened our families and social fabric. The fear that underlies such attitudes is promoting intolerance, restricting our openness and limiting our freedoms. By having the courage to restore common decency, relationship, community and cooperation to their appropriate places in our societies we can promote everyone's well being and enhance the resilience and durability of our societies.

15. *Economies for Wellbeing*

The identification of economies as complex systems provides a more appropriate and effective theoretical framework than the dominant economic paradigm, which is an incoherent grab bag of inadequate theory, deficient accounting, antiquated practices, ignorance and woolly thinking. With a clear goal and a better understanding of the system, we can better hope to find more effective management methods, and to align our methods with our goal.

The goal is simultaneously to support the wellbeing of individual people and the wellbeing of societies and the living world in which we participate. The behaviour of complex systems is determined by their internal feedbacks, and we have seen some ways in which we can influence those feedbacks. We can now bring the main ideas of this book into a more coherent view. With a more coherent approach to a more coherent system, and less pulling in many different directions, we might improve our wellbeing with surprising efficiency and speed.

Wellbeing can be taken to include basic material needs along with social, cultural, aesthetic and spiritual needs. In other words the purpose of the economy is to support us as whole beings. Our social wellbeing will not be provided for unless the health of society is also an explicit goal. This means policies should support the viability of local communities, limit financial inequality and promote beneficial social functions. Local culture, in its broadest sense, should also be actively supported, to balance or counter the incursion of a global monoculture. Although these broader considerations are not the focus of this book, social and cultural issues will be briefly discussed in the next chapter.

Monitoring progress

One of the many baleful effects of neoliberalism has been its blanket denigration of government. Hayek's dystopia of reptilian individuals requiring only the interactions of the market to organise them is a mirage - we are social beings, not asocial reptiles, and unfettered markets would not in any case yield that kind of order. There are legitimate and essential roles of government, basically to monitor the state of our society and to manage it in the way we desire. If we do not like the way a government, or a governance system, works, then we need to improve it, not abolish it. Some promising developments in governance will be mentioned in following chapters.

At present government monitoring of the state of our society is in a lamentable state, comprising a heavy focus on materialism and the GDP, with its fundamental faults, and a haphazard collection of some social and a few environmental indicators, along with various opinions, expert or otherwise, and a few myths, such as that government budgets must be balanced. There needs to be a rapid shift away from the GDP, and there needs to be a better balance among indicators of economic, social and environmental conditions. The GDP is indefensible even as a measure of material wellbeing, and its use is highly misleading and leads to severe distortions of our priorities and societies. In place of the GDP, something like the Genuine Progress Indicator would be a much better, if imperfect, indicator. It would be better to have the GPI encouraging us vaguely away from the precipice than to be charging hell-bent towards the precipice in pursuit of a larger GDP. As discussed in Chapter 8, triple bottom line accounting, covering economic, social and environmental conditions, would be better again. We also need to monitor assets and liabilities as well as income and expense, so we know whether our condition is actually improving.

The state of our societies is already monitored in some significant and useful ways (such as through health and crime statistics), but we could develop and broaden these in a systematic way, so they more directly measure the health of families, local communities and other explicit aspects of our social fabric. In the environmental area we could put more serious effort into better measuring and monitoring of stocks (the analogue of assets) and flows (the analogue of income).

It will be politically important to put better measures of progress in place quickly. Much of the old establishment will be unable or unwilling to see the benefit of the broader approach, and will staunchly or hysterically claim that any loss of focus on increasing the GDP will cause the sky to fall. People must be clearly informed of the broader aims of new policies, and the new measures will be essential to keep people well informed about the benefits of new policies.

Main management tools

With better monitoring of economic performance in place, or in prospect, the next issue is what approaches and tools are available to manage the economy. The broad approach was discussed in Chapter 7. The approach is not to try to manage details, but to manage the overall character - the kinds of behaviours occurring, and the trends in those behaviours and their consequences - having regard for the nature of the beast. The character of complex systems is determined by their internal feedbacks, so the most efficacious way to manage them is to change the feedbacks. Economic feedbacks can be changed either by applying financial incentives and disincentives (subsidies and taxes) or by changing where a price signal originates or reaches. Regulation is a less elegant approach. There is great scope for regulation to be reduced, but there will be some circumstances in which regulation will probably still be necessary.

The use of taxes and subsidies is already widespread, but at present they are applied incoherently. There are many perverse subsidies, and taxes are applied to beneficial things like income and payrolls. If we clarify the goals of our economic management, and then

use taxes and subsidies in ways that support those goals, instead of pulling in all directions, then we might find our economy functions more efficiently (accomplishing more with less effort) and that the quality of our lives improves steadily (whereas the quality of many peoples' lives is currently stagnant or declining). To adopt this approach, of course, we need to transcend the neoliberal denigration of "intervention" in the economy, and to regard our efforts instead simply as the sensible management that is clearly required in order for wild-horse markets to deliver desirable results.

A tool complementary to financial incentives, which change the strength of a feedback, is to adjust where a feedback feeds back to or originates from. A good example given in Chapter 7 was of a subsidy applied to compact fluorescent light bulbs. When the subsidy was applied at the retail level there was only a small effect. As the subsidy was moved back along the supply line through wholesaling, distribution, and manufacturing, the effect became larger. As the direct feedback became more effective, there was a synergy with feedback from economies of scale, until compact fluorescents became common and much cheaper. The principle here is to increase the leverage of the subsidy by moving its application back along the supply chain.

A related and potentially very powerful tool is to change the sign of a feedback by changing the relationship between producers and customers. The example cited earlier was of Interface Carpet, which switched from selling carpet to providing a floor-covering service. Prior to the switch, Interface's incentive was to minimise the durability of its carpet and to have its customers use carpet as wastefully as possible, for example by buying broadloom carpet that would be thrown out after wearing in only a few places. After the switch Interface's incentive was to make its carpets as durable as possible and to supply carpet tile, so that only the worn patches would need replacing. Because it retained ownership of the carpet, Interface then had the further incentive to reduce its manufacturing costs by redesigning its carpets to be recyclable.

The essence of the Interface example is to change from selling a thing to providing a service. Instead of selling carpet, Interface provided the service of attractive and functional floor coverings. This change could be made widely through our economies. As Amory Lovins puts it, "people don't want electricity, they want cold beer and hot showers". If we focus on the provision of the end-use, the service provided, then the things that generate the service (carpets, refrigerators, water heaters, cars, whatever) can be left in the ownership of the manufacturers, whose interest then becomes making them as efficient and durable as possible. In this way the feedback switches from inducing wastefulness to inducing the efficient use of resources.

We might also think of this change as increasing the leverage of the feedback. Whereas the compact fluorescent light bulb example shifted the feedback *target* further back along the supply line, the shift to providing a service shifts the *source* of the feedback further down along the supply line, so the feedback comes not just from the product, but from the service enabled by the product.

Trade and international relations

As well as managing domestic markets, we need to rebalance our economic relationships with other countries. Free trade and the free international movement of capital are as unjustified and misguided as free markets. The interactions among nations are complex, and involve far more than economics, for example power relationships, distinct cultures, sovereignty, and the social and cultural vitality of each nation. The fundamental principle is that boundaries, of economic entities as much as organisms, have to be carefully managed to exclude poisons and to preserve life-blood.

The subsidiary principles identified in Chapter 6 are that trade should be of mutual benefit, and that the health of the component parts of a nation must be carefully nurtured. Component parts include not only economic sectors but such aspects as local culture and the cultivation of an independent (but not belligerent) mindset, so as to avoid the dependency trap. We also need to collect much more specific information so as to be able to monitor the effects of trade and foreign investment, and to answer critics proclaiming disaster.

This topic is beset by black-and-white interpretations and rhetoric. If you question the principle of free trade you are frequently assumed to be, or accused of being, a "protectionist". It is not a question of free trade or no trade. It is a question of careful management of trade, and financial transfers, so they are of benefit. This detailed management will be specific to the time and place of each nation, as local employment, cultural and other factors are considered. Exchange can be of mutual benefit, and that principle is not being questioned. However the naive and plainly incorrect assumption that any exchange is good for a nation is foolish and needs to be replaced by a more sensible and pragmatic approach.

Finance, debt, banking, investment, money

The financial and monetary sectors deserve special attention because they occupy strategic places in the economic system. However finance, debt, banking, investment and money are closely intertwined, more closely than they need to be at present. Each has its dysfunctions, but each also aggravates problems in the other. Therefore we need not only to stabilise each system, we also need to change the negative synergies between them.

The financial system is highly unstable, and even in normal times its dominant activity has become speculation, which is parasitic, and the speculation greatly amplifies short-term volatility and impedes economic efficiency. The financial system also destabilises the monetary system, because the way money is supplied is entangled with investment and speculation. The reluctance of the economics profession to discuss alternative ways of supplying money needs to be overcome. The supply of money can be decoupled from investment, so that Wall Street failures will not have such a devastating effect on Main Street, or in other words so that failures of investment or speculation do not impede business as usual.

We do need a financial sector to facilitate investment, and we need a monetary (banking) sector to supply money to facilitate exchange. Both of these functions should be

regarded as essential services. They should be carefully regulated because of their potential, demonstrated many times over, to disrupt the productive economy and to capture great unearned wealth. They should not be dominant sectors. Each could comprise perhaps a few percent of economic activity and still adequately serve the productive economy.

Stabilising financial markets

A powerful reform, sometimes talked about but not yet acted on, would be to apply transaction taxes to financial markets, sufficient to take most of the profit from short-term speculation. These are sometimes called Tobin taxes. Their primary purpose ought not to be to raise revenue but to slow and stabilise financial markets. At present only 1-2% of financial market activity is plausibly attributable to allocating investment. The rest is short-term speculation. This speculation generated the $600 trillion in debt that brought the system down, so eliminating most of the speculation could dramatically reduce the amounts of unnecessary debt.

As well, if financial investors were forced to invest for more than a few hours, days or weeks, or milliseconds, they would have to consider the actual productive potential of firms, instead of playing games with the wild fluctuations they themselves generate. Managers of productive firms could manage with longer term strategies than those focussed on next quarter's bottom line, and they would not have to hedge against such large and frequent fluctuations of share capital and currency exchange rates. Less of the wealth produced by the productive economy would be siphoned off, unearned, to the financial sector. The whole economy would function more efficiently.

There is a move, mainly in Europe, to impose so-called "Robin Hood" taxes on financial markets. Although these would be of some benefit, the name makes clear the intention is to raise revenue rather than the larger goal of stabilising the markets. The movement is therefore vulnerable to the charges of promoting "wealth transfer" or "class war" rather than the more efficient and equitable operation of the economy.

Limiting debt

A central problem of the financial/monetary sector is that it is allowed to create too much debt. When the debt burden becomes too great, people start to default on repayments, and that triggers a cascade of other defaults and the whole house of cards comes tumbling down.

Excessive debt is the key to the so-called "business cycle", and it is the key to the larger boom-and-bust events that punctuate the economic history of the past several centuries. This is evident from common sense, and it is now clearly documented as well. In Australia in 2007 private debt increased by 20% of GDP, was shown in Fig. 8.3. That means simply that 20% of the money Australians spent in that year came from new borrowing. US private debt was increasing at a comparable rate, and reached an even higher ratio to GDP. People were living beyond their means. The economy was booming, but it could not last. As the debt-fuelled bubble collapsed in the US, people stopped borrowing and started paying down their debt, either out of new-found prudence or because they had no choice. When people are paying off their debts they can't spend that

money on new TVs and cars, so economic activity slows. In the US it slowed so much it became the greatest recession since the great depression. This common sense account is supported by quantitative evidence such as the correlation of unemployment with change in debt shown in Figs. 12.1 and 12.2.

There are several actions that can progressively rein in the creation of excessive debt. After the Great Depression merchant banking and investment were separated from retail banking, but that separation was abandoned in the US in the 1990s. It needs to be restored and perhaps strengthened, so retail banks are prevented from amplifying debt bubbles and from gambling their customers' money away.

Money and investment

In the longer term we will need to further reduce our capitalist system's addiction to debt. We also need to make routine business less vulnerable to failures of investments or speculations. These needs are closely related. Debt can lead to higher, quicker profits, but debt always brings risk, and risk is chronically under-valued, as was painfully demonstrated in the US sub-prime mortgage collapse.

One of the major generators of debt is the issuing of new money for routine investment. This occurs because of the fractional reserve banking system, by which bank "loans" comprise only a small fraction of existing savings, the balance being made up from new token money created out of nothing. Token money is a promise to pay in real goods or services, so it is a form of debt (Chapter 10). This is how a great deal more debt is created, and also how the supply of money is coupled to the investment process, and thereby made vulnerable to investment failures. This is why Wall Street's folly and greed had such a devastating effect on the world economy.

The supply of money is historically the aspect of economies most neglected and perhaps the most urgently in need of attention. We need to develop a proper understanding of the nature of money, an appreciation of the roles of money and debt in macro-economics (currently almost absent from economic theories and models), and a disentangling of investment from business as usual, so that Main Street is not brought down by malfunctions on Wall Street.

The investment process itself could use two fundamental reforms. First, to invest primarily savings (from the past) instead of new money (which involves borrowing from the unknown future), so as to decouple investment from the supply of money, and thereby to reduce risks to Main Street. This would allow us to break out of the boom-and-bust cycle that at present is fatalistically but unnecessarily accepted. Second, to exploit a range of ownership possibilities, including cooperatives, employee ownership, other stakeholder ownership, community ownership, and various forms of build-own-operate-transfer arrangements that provide reasonable returns for investors but leave ultimate ownership with individuals and communities. These and other innovative forms of ownership were discussed in Chapter 9.

Sound money

The dominant form of money used today is token money, which has little intrinsic value. The essence of token money is that it is a contract between the issuer and the

community: the issuer undertakes to supply goods or services to the community in future, so that the holder of the issued money may redeem it for things of actual present value, instead of just token value. In this way token money involves a debt, and because debt involves a promise to pay in the future, which may not turn out as planned, debt involves risk. It would therefore be wise to minimise the amount of money, and other forms of debt. This does not mean eliminating debt, and money, but it does mean recognising debt as economic fire (Chapters 10 and 11), and handling it with due care.

A more stable, more easily measurable and more manageable form of money supply is possible. The primary role of money is to facilitate exchange. The current practice of issuing new money or other debt instruments for investments or, worse, speculation, should be severely limited and carefully managed. The ability of the "shadow banking sector" to invent and issue many complicated forms of debt, leading to the creation of around $600 trillion in debt, is what turned the US subprime mortgage crisis into the Global Financial Crisis of 2007, and threatens still to cause an even greater global financial collapse.

Investment can be done primarily with savings, in the rich countries that can well afford it. Money can be issued and de-issued according to the needs of daily economic exchange (business as usual). If both reforms applied then our financial and monetary sectors would be less entangled and far more stable, and our economies and societies correspondingly more productive.

Money is centrally important to an economy, for three reasons. First, it greatly facilitates exchange, and thus allows us to move well beyond the severe limitations of barter. Second, it is a primary signalling mechanism, and it thus fundamentally influences the behaviour of the complex system that an economy is. The economics profession currently recognises the signalling role of money, but does not appreciate its full power, first because the profession has little understanding of the nature of self-organising systems that are far from equilibrium, and second because money and debt are not even included in their models. The third reason money is important is because it relates the present to the future. Thus not only is money a key signalling medium, but it operates on the time-development of the economy, what physicists would call the dynamics of the economy. This is completely beyond the reach of conventional neoclassical economics, which is a quasi-static conception. Only by understanding such dynamical processes can we hope to understand the booms and busts that our economies have perennially and regularly experienced.

A more stable system

In summary, token money should be issued to facilitate exchange, and not for investment. The amount of money required for routine exchange is much less than the amounts of money currently in existence, so this form of debt can be kept to a minimum. Money can be issued through accounts with clear limits and fees, as described in Chapters 10 and 14.

Investment would then need to be done mainly from savings. In the long run this should make little difference to our rate of investment, because the money now used to pay unearned interest on new money would be paid into savings. Such a proposal at

present might well be ridiculed, but China is demonstrating that rapid growth and a high savings rate are quite compatible. It is ironic that the still relatively poor Chinese economy is bankrolling the US economy, which has sunk deep into debt since the neoliberal era began.

The *transition* from debt-funded to savings-funded investment would be more challenging. Either economic activity would have to slow while the existing debt was paid down, or there could be a full or partial debt jubilee, meaning debts would be cancelled, and we could start again with a more sensible and stable system. A debt jubilee would be morally justifiable because the present system yields unearned income for those able to issue new debts.

The reforms just summarised, especially the reforms of money and investment, would involve fundamental changes to financial and monetary institutions, and would need to be carefully managed and coordinated. No doubt there would be hysterical resistance from the present financial and banking sectors, who of course would defend their grossly excessive profits and power. However more people are waking to the reality that we are ripped off by an out-of-control financial sector. Another crash is inevitable if substantial reforms are not undertaken. The political will for these reforms would then increase.

Reducing inequality

At various points through this book I have remarked that there are mechanisms that pump wealth from the poor and middle class to the rich. Having been through many aspects of economies, it is useful now to collate some of the main mechanisms, in no particular order.

Financial market speculation

The financial markets are dominated by speculation, and the objective of such speculation is to gain wealth. Because speculation serves no useful purpose it is parasitic, simply siphoning wealth from the productive economy. The amount of wealth involved is very large. Some indication might be obtained from the fact that financial sectors in the US and Australia now account for 30-40% of corporate profits. Because corporate profits would be a large fraction of GDP, this means a significant fraction of total wealth is pumped to the rich by this mechanism.

Capturing emergent community wealth

This is the wealth that results from the proximity of individual assets and investments. In other words it is the increase in worth of your property due to investments by neighbours in their properties, as distinct from your direct investment in your own property. It therefore belongs to no individual, it belongs to the community. In some places some of this wealth is captured for community use. For example in Australia local governments charge land taxes, call rates, based on the current land value, although the tax rate is not calculated to capture all of the community wealth. However in many instances most or all of the wealth passes as a windfall to private interests, much of it to developers and landlords. In this way small property holders and renters lose their share

of community wealth to those rich enough to be able to capture it. Individuals have no right to this wealth, so it is unfair and iniquitous that they are able capture it.

Interest charged on new money

Our money is created in the course of making loans, and interest is charged as though it were savings rather than having been created out of nothing. Because we need a certain amount of money for the economy to function, this burden of interest weighs on the whole economy. Banks profit by maximising loans, so the amount of money in circulation is maximised, and this increases the burden on everyone. This is effectively a private tax on the entire economy, and we saw in Chapter 14 that it pumps wealth to the richest ten percent.

The fees charged by the proposed community banking system would place far less burden on the economy because they would tend to minimise the amount of money in circulation, because individuals could minimise their account balances, and because the community banks could be required, implicitly or explicitly, not to promote excessive issue of money. The fees would be intended to pay for the service of providing a medium of exchange, and no exploitation of the strategic role of money need be permitted.

Access to loans

The rich can obtain loans much more easily than the poor. They can invest their loans and become even richer. This mechanism is widely recognised and clearly an important factor, though it is hard to estimate the amounts of wealth involved. Mohammed Yunus demonstrated, with his Grameen Bank in Bangladesh, that it is possible to give loans to the poorest people and so to reduce this iniquity.

The ownership escalator

We use only a restricted range of ownership options in our present economic system. As a result ownership is highly concentrated. Even though public corporations are owned collectively, it is the rich who own shares disproportionately. Even though many people own some shares through retirement funds, the distribution of ownership is still strongly skewed to the rich. Once you gain ownership of significant assets, wealth begins to flow to you. If you are poor and have to rent your accommodation, wealth drains away from you. Owners are on an up escalator. The poor are on a down escalator.

As William Greider observed, the problem is not that capital is privately owned, the problem is that most people don't own any. We already have many forms of ownership that can change this. Ownership can be distributed much more equitably by actively promoting less common forms such as ownership by employees and other stakeholders. Ownership can also be conditional, with time limits and progressive transfers of ownership, or owning buildings but not land, and so on, as discussed in Chapter 9.

Corporate welfare

There are many subsidies paid to corporations or rich minorities that benefit the rich at the expense of the poor. Often they harm the environment as well, thus harming everyone. Even a decade ago perverse subsidies amounted to perhaps $2 trillion annually (Chapter 7), a considerable fraction of global wealth generation.

Tax avoidance

This is closely related to corporate welfare, because it is practised mainly by large corporations, particularly transnational corporations. They do this by complex internal transfers of money that exploit loopholes in tax laws, or differences in tax systems among nations. They are abetted by a few small nations that charge minimal corporate tax. Such tax havens could be closed down overnight by concerted action of a few rich nations, but those nations' governments are owned by the rich, so it doesn't happen. The proportion of taxes collected from corporations has dropped by about half over the past half century.

There are surely other mechanisms at work. This list ought to be sufficient to establish that a great deal of wealth is effectively being stolen from the majority by the rich minority. This ought to be obvious also from the information in Chapter 2 on how income distributions have changed through the neoliberal era. These show that the greater proportion of wealth increases have flowed to the very wealthy, and only a small fraction of the new wealth has flowed to everyone else.

Right wingers are fond of decrying what they call "wealth transfers". They are referring to such things as progressive income tax scales, unemployment benefits, free or subsidised public services, and the many other payments and services used by social democracies to help the less fortunate in society. These mechanisms of the so-called welfare state do indeed transfer some wealth. However the amounts transferred have only reduced the extremes of poverty, and the inequality characteristic of traditional capitalist societies has persisted strongly.

Particularly in the neoliberal era it is evident that far greater amounts of wealth have been transferred in the other direction, from the poor to the rich. However the means by which they have been transferred are less visible, and almost never discussed. They need to be discussed.

If we simply eliminated the mechanisms that unfairly pump wealth to the rich, our societies would be considerably less unequal. The need for welfare would be greatly reduced. The efficiency of the economy would be increased, because producers would pay closer to the full costs of production and costly welfare bureaucracies could be reduced. The dignity and self respect of the less wealthy would not be compromised by having to accept welfare, and by being perpetually vilified by the greedy.

To be quite clear, I am certainly not arguing for complete equality of wealth or income. I think wealth differences are to be expected. What I think is intolerable is that the great majority of people are not getting the share of collectively generated wealth (which is most wealth) that their effort deserves. The rich who corral this wealth for themselves are not only gaining it unfairly, their wealth is typically used to distort our societies and democracies further in their favour. In times past such behaviour was explicit - the pharaoh took from the poor, by force or threatened force. Our supposedly equal-opportunity, democratic societies are still very far from their claimed ideal.

16. Societies and Environment

Both our human societies and the natural world are suffering heavy collateral damage from our present economic system. Thus we need to reduce the negative effects of the present economic system. We can also aspire to stop and reverse these effects, so that economies promote healthy, open, democratic societies and a healthy living world around us. Although this book is focussed on the economic aspect of society, the economic and social aspects are not really separable. So as not to perpetuate the false separation of the economy from the rest of our lives, I will therefore indicate at least briefly how we might mitigate and potentially reverse the baleful effects of the economic system on society and the environment.

It is striking that under the present regime social and environmental needs are always considered to be in competition with economic needs, and to be secondary to them. Not only should social and environmental needs not be secondary, but in a sensibly conceived economy there would be no conflict between "economic" needs and the health of society and the environment. The richer economies take care of our basic material needs. However if our goal is wellbeing, in the broadest sense, then taking care of social and environmental needs are just aspects of economic management.

Nurturing Society

Given the doubt and confusion created by Hayek and his disciples regarding the importance, nature and even the existence of society, it is worth saying what I mean here. The conception of society that I use is from the perspective of systems theory, which cuts through some old debates and which highlights the folly of Hayek's extremism. Society is more than a collection of individuals. Society is what *emerges* when a lot of individuals interact socially. The nature of that society depends on the nature of the social interactions. If there were no interactions, there would be no society. Given that we are a social species, we do interact socially and there is such a thing as society. If our social interactions are relatively trusting, then our society may be peaceable, and tolerant of diversity. If our interactions are untrusting, our society may be more anarchic and violent, or it may be rigidified by rules and police.

The foundation of society is small community. Until quite recently we humans have lived in small communities. Small communities nurtured our humanity over hundreds of thousands of years, and our emotional and psychic identity is firmly and intimately anchored in them. We need to feel we belong and are accepted, otherwise the echo of the

fear of being alone on the savannah soon begins to eat at us. This is fundamental to our social nature. The importance of small community has been lost from sight, but it must be restored as the foundation of our societies. This does not mean a return to villages and tribes, it simply means a re-balancing, so everyone can, if they choose, be in a small community, and so national- and global-scale affairs comprise only those tasks that cannot be accomplished at more local scales.

Despite the protestations of the political right that it supports families and "family values" (of a certain kind), the neoliberal dominance has put families under stress and damaged neighbourhoods and small communities. People no longer have as much time to spend with their families and friends, or to be involved in community activities, such as sporting clubs and volunteer organisations.

We have also lost sight of the fact that our physical survival requires people who know their local human and non-human communities intimately. We need farmers who know how they must deal with their local patch of Gaia in order for themselves and the living world around them to flourish together. Industrial agriculture uses homogenised means to grow monocultural crops, and it is destroying the fertility of the land and the diversity of life. Monocultures are prone to collapse from disease and plagues. Every locality is different and requires the intimate knowledge of those who have grown up with it. Few have expressed this more clearly than the American "agrarian" Wendell Berry, who has written[103]

> I think that good farming is a high and difficult art, that it is indispensable, and that it cannot be accomplished except under certain conditions. Manifestly, good farming cannot be fostered or maintained under the rule of the presently dominant economic and cultural assumptions of our political parties.

The style of economic interactions can even transform the nature of society. The Western democracies, our leaders frequently claim, aspire to personal liberty, democratic governance, the rule of law (as against the whims of rulers or bullies), freedom of speech and assembly, tolerance of diversity and so on, in other words what we might call an open, democratic and tolerant society. This is my own aspiration also. I would not be writing this book if I preferred an authoritarian society. Nor would I be writing it if the so-called democracies had not strayed so far from their claimed ideal.

Neoliberalism fails to support an open, democratic, tolerant society because it over-emphasises individuality and competition, at the expense of community and cooperation. One extreme expression of this is Hayek's vision of a "society" whose interactions are purely economic, with no social interactions at all outside the family. Another extreme expression was the claim by Hayek's disciple Margaret Thatcher that there is no such thing as society.

The result of the heavy emphasis on competition at all levels of the economy, and the neglect or denigration of cooperation, has been a weakening of communities, a fraying of the social fabric and a rise in fear, mistrust, conflict and even violence. Social and political commentary has become much more strident. Social services have been neglected at the same time as inequality of wealth has dramatically increased. Poverty and unemployment have increased since the Global Financial Crisis, and the middle class has shrunk. The

accompanying bitterness, envy and resentment of the super-rich, along with the reduction of support for those affected, further weakens the social fabric and threatens more serious social breakdowns. As such disorder rises, as it inevitably will, authorities tend to respond with more enforcement and rigidity, thus reducing the openness of society.

Neoliberalism has, by promoting the extreme wealth of a few, seriously compromised the functioning of democracy. The super-rich can more easily influence governments through lobbying, and they have purchased the subservience of major political parties, which have been only too happy to prostitute themselves in their pursuit of power. The super-rich have also increased their control of the flow of information and ideas in our societies, through ownership of the media and the imposition of their world view upon them, and even, lately, by conducting explicitly partisan advertising campaigns. Democracy cannot flourish without a full flow of information and ideas, nor in the absence of candidates and parties who represent the full spectrum of views and interests within society.

As we become more frustrated, resentful and disorderly, and as authorities respond with force, we move towards a fascist state. By fascist I mean something like the original Italian version, a state in which the government is in alliance with, or controlled by, the most powerful private entities, such as wealthy individuals and corporations. Thus can the economy so severely distort the nature of society that it may dictate a completely different form of society.

At the heart of the neoliberal world view is a lack of trust. It has attracted those who think you have to compete to get on. There is no belief in our better angels, in the fact that people can also get on by helping each other. There is no recognition that if we waste less energy in conflict we will do better, as the internal histories of modern nations demonstrate. Helping each other, cooperating, requires trust. Trust is not simply a naïve faith in people's goodness, it is a willingness to appeal to people's better sides, and to not be deterred if some do not respond positively. To be trusting requires some courage.

That is also what is lacking in the neoliberal world view: courage. It is an attitude borne of insecurity, of fear that we will lose if we do not guard ourselves carefully. Fear begets fear: the more some people act mistrustfully, the more others tend to respond in kind. Fear also begets other dark forces: intolerance, which begets hatred, which begets violence. Most of the misery we human beings suffer is inflicted by ourselves. If you dig for the emotion that underlies the violence, and its precursor the hatred, you will find fear. A world view based on fear, and that cultivates fear, fosters the dark side of our nature.

If the purpose of the economy is to support the society we choose to live in, and if we choose an open, democratic, tolerant society, then we must find the kinds of economic interactions that will not only promote material welfare, but will foster the kinds of social interactions that in turn promote, openness, democracy and tolerance. Central to that effort will be the intention, in everything we do, to restore trust among ourselves, so that cooperation and community may flourish again, and so fear may be diminished and cease to drive us along destructive paths.

In all economic interactions, domestic and international, we need to clearly reaffirm the vital importance of social relationships, and of the cooperation that such relationships

can engender. Cooperation is as pervasive in the natural world as competition, and the same is true in healthy human societies. The recent emphasis on competition at the expense of cooperation, in its many forms, is an anomaly and a pathology.

A number of the economic reforms already mentioned will tend directly to promote community, such as alternative forms of investment, in housing and other local enterprises, that will keep emergent wealth within the community rather than allowing it to drain away to distant shareholders. The explicit recognition of emergent community wealth, the component that grows from the proximity of individual enterprises, also promotes the health of communities. As economic viability of communities is restored, so the social bonding and trust they naturally engender will grow.

As the relentless focus on competition is reduced, job security will improve and work hours will reduce. Employees will cease to be treated as an expendable cost item and be valued again for their knowledge, initiative and loyalty and will be treated as fellow human beings. They will feel less pressured and more appreciated, and will arrive home to their families less stressed and more able to engage with their families and communities.

Many of the other economic reforms mentioned are intended to reduce the excesses of our anarchic economic system and to prevent the super-rich from siphoning wealth away from others. As inequality declines, so envy and resentment decline, and trust and cooperation are more able to grow. As wealth flows more equitably, so the super-rich are less able to distort and corrupt democratic processes, and the rest of us feel less disempowered, less cynical and more able to find political candidates in whom we can place some modest measure of trust.

To maintain open, resilient and democratic societies there are other concerns that need to be addressed. Though some of these have some relation to the economy, others do not. Two important negative influences are the media and the marketing industry. Although they are both based firmly in the consumer-capitalist economic system, they operate more directly on social interactions: the media cultivate conflict, and marketing cultivates personal insecurity and envy. Both play to our darker angels, and both tend to keep us mired in immature actions and interactions. Marketing is also a major force promoting overexploitation of the biosphere, and thus it undermines our very existence on planet Earth. Though their reform is hardly thinkable in present political climates, we must recognise the highly negative aspects of their modern roles, and of course we must work towards creating a political climate in which reforms are thinkable.

Reform of media, or more generally of public communication, might be less problematic than is usually thought. Ownership of the media by government is no more desirable than concentrated private ownership, and I do not advocate it. Rather, I propose *distributed* private ownership. For example, the ownership of mass media outlets could be distributed through the community it serves, with no individual allowed to own more than, say, 0.1%. Thus there might be 10,000 or 500,000 owners. The dominance of a few voices with narrow interests would be greatly diminished. Unfortunately I do not have a comparable suggestion for the reform of marketing, but if people are awoken to the potential then creative options might be forthcoming.

There is also the challenge of finding ways to organise and govern ourselves now that we live in groups larger than hunter-gatherer bands. This challenge can be addressed more directly than just by economic reforms intended to reduce concentrations of wealth and its associated power. The development of representative democracy over the past couple of centuries has been one attempt to improve on the multi-level, unresponsive hierarchies that are the dominant feature of political history. However the need for better governance arises not just in politics, but also in large businesses, which are still dominantly organised in top-down hierarchies. A fundamental problem with hierarchies is that information readily flows down - in the form of commands - but little information flows up. That is why leaders chronically end up poorly informed and underlings complain, generally with reason, about poor-quality decisions.

Fortunately there are some promising alternative possibilities available. One example is the governance structure of the Mondragón Corporación Cooperativa in the Basque country of Spain[104]. This is a network of cooperatives that has grown over several decades to have a multi-billion dollar annual turnover. It comprises over 100 small cooperatives, usually with no more than a few hundred people. Two higher levels of organisation have emerged and there are also cross-linking financing and monitoring bodies. The grouping has a network structure that is more sophisticated than a simple hierarchy.

Internally, the governance structure of each cooperative is also a network. Rather than a single board, there are several governance components with complementary and cross-supervisory roles. Not only owners are represented in the governance structure, but also employees, suppliers and customers. Being a cooperative, the employees are the owners anyway. The philosophy is that employees, suppliers and customers bring a great deal of valuable information to the business, and the main representative board provides a forum in which the different interests of the various groups can be worked through face to face.

The novelty and strength of such structures is that they harness people's innate social behaviours to the purpose of balancing the various and differing interests, rather than working at social distances beyond the range of people's social behaviours. The harnessing comes about not only by bringing various parties together in one room, but also by having several bodies involved in the governance that have cross-checking and monitoring roles, so conflicts of interest between governors and the business are also restrained.

The cross-checking functions of this kind of network governance suggest ways to extend the "checks-and-balances" concept of the United States, in which the executive, the Congress and the courts are seen as checking and balancing the power of each other. In both politics and business, additional chambers or boards might oversee the gathering and dissemination of unbiased information, or monitor the main governing bodies to ensure they are functioning as intended.

An even more advanced governance model is *sociocracy*[105]. It draws on experience with industrial democracy and with Quaker Meeting practices, which demonstrate the value of self-discipline and respectful listening in meetings. It also draws explicitly on cybernetics, the science of control systems, which is used widely in engineering and computer science. Cybernetics is part of systems theory, and a key idea is to use feedbacks

to stabilise and regulate the behaviour of a system. Sociocracy was refined in practice in a functioning business. It starts from the recognition that good governance does not just require decisions, it requires regular adaptation as circumstances evolve. Adaptation requires regular information about how current systems are functioning, how well tasks are being accomplished, and what new circumstances need to be accommodated. Governance is thus conceived as a repeating cycle of deciding, doing and monitoring, with the monitoring feeding back into new decisions.

A novel feature of sociocracy is that the different phases of governance are carried out in different organisational forms. Command hierarchies are not good for monitoring, because the flow of information up such a hierarchy is typically low. However hierarchies are good for getting things done, so long as the task is clear and the people are in basic agreement with the need for the task. Therefore the doing phase of governance is conducted in a traditional command hierarchy.

On the other hand the monitoring and deciding functions of governance are conducted in a circular forum. Each circle comprises a small number of people who function as equals within the circle, though they may occupy different levels of the "doing" hierarchy. There may be many circles in a large organisation, and these circles may be organised into a hierarchy. Representatives from each level are included on the next higher and lower levels, to facilitate the flow of information in both directions, up and down. The advantages of the circle process are that the relevant knowledge, experience and creativity of its members are brought to bear, that potential practical difficulties are more likely to be identified before they become problems, and that decisions have the consent of everyone who will be involved in carrying out tasks in the "doing" hierarchy. There is much more to how sociocracy works, and this is not the place for a detailed account. Such a novel form of governance needs to spread and develop before it can begin to gain wider use, but it shows that we are not constrained to the same old models.

These more developed forms of governance, such as compound boards, network governance and sociocracy, beg be taken into the political realm. We can aspire to design new political structures that improve the monitoring and resolution of conflicts of interest and that monitor the performance of the system. Such systems are closer to the way organic systems work. There is a richer set of internal connections, with more internal feedbacks to regulate behaviour. The Mondragón cooperatives have multiplied in a very organic manner. A sociocracy is self-organising, and its governance is distributed throughout itself. Organic systems function in this way, and they have been honed for about four billion years, so we should pay close attention to the lessons they offer us.

Neoliberals use the word "freedom" with a peculiar insistence. One expects a level of political hyperbole. For example President George W. Bush insisted his invasion of Iraq was to promote "freedom", among other lofty goals, though some Iraqis might have been puzzled by the notion of freedom delivered at the point of a gun. However neoliberals seem to go beyond such hyperbole and insist, with Hayek, that a state of globally unregulated markets is true freedom, notwithstanding the rather obvious and imposing

presence of giant transnational corporations that are increasingly determining the domestic policies of nominally independent countries.

The philosopher Karl Popper[106], writing in the context of the rise of fascism, offered the key insight that individual freedom is not maximised by the absence of regulation. Rather individual freedom is maximised by an *optimal degree* of regulation. Freedom can be limited as much by too little regulation of a society as by too much, if lack of regulation allows bullies and warlords to take over. The same lesson emerges from the perhaps unlikely source of modern systems theory, and also from studies of social systems in the living world. In self-organising systems strong interactions with weak feedbacks yield lifeless stasis, whereas strong feedbacks yield chaos. Only with an optimal degree of interaction is there a lively balance between stultifying order and anarchic chaos.

Likewise in any social system there is a tension between the desires of individuals and the survival of the group. The very existence of social systems, in nature as well as in human experience, implies that an individual's welfare is maximised not by being an unregulated loner but by conceding some freedom of action in return for the benefits of belonging to a cooperative group. A society of unrestrained individuals is no society at all. In other words pure competition is not optimal. Neither is pure cooperation optimal, at least for human beings, as Communist states found out. An optimal social system involves a balance between competition and cooperation, between individuality and community.

Karl Popper, in *The Open Society and It's Enemies*[51,106], argues that the goal of a liberal democracy ought to be to maximise the creativity of its citizens and the openness of its debates. His reasoning is that a society in which the flow of ideas is restricted will have fewer options to draw upon as its circumstances change, and the society may eventually be overcome by some unexpected development. There are many historical examples of tyrants or ruling classes losing touch with the people and with circumstance, and they or their society failing as a result. A society that encourages and canvasses the widest range of options will thus have the least chance of overlooking options that will keep it viable.

We can recognise here the cultural equivalent of maintaining a diverse gene pool, which improves a species' chance of surviving change: we need to cultivate and maintain a diverse meme pool. Popper proposes that the implementing principle of a liberal democracy needs therefore to be the maintenance of openness. Interestingly, he distinguishes this from majority rule. The reason is that majorities sometimes vote to restrict the openness of society. A classic but not unique example is that Hitler came to power through democratic processes. Thus, Popper argues, the maintenance of an open society might sometimes require a minority to defend the institutions of a liberal democracy against a majority.

The intrusion of corporate power into politics and the closely related rise of anti-democratic demagogues are manifestations of the under-regulation of our society. They are the bullies and economic warlords spawned by anarchy, and they severely limit the options of our society, by limiting the expression of alternative views and of new ideas. The assault on liberal democracy and the assault on our planetary life support system are both symptoms of those restricted options, and they have reached the point of

endangering the continued existence of our society. We must therefore defend and extend the institutions of liberal democracy, in the broadest sense developed here, in order to retrieve a future for our society. This will require some re-regulation, particularly in finance and some areas of commerce, to restrain the current destructive excesses.

The surest way to entice people into giving up their freedoms is to make them fearful. This was Hitler's tactic, and it has been the tactic of those who currently exaggerate the threat of terrorism. With the false cry of freedom on their lips they have not only invaded other countries, they have systematically assaulted the institutions of freedom in their own countries, notably in Australia, Britain and especially the United States. The test of their real devotion to freedom is that those who attempt to debate their policies have been routinely labelled leftists, malcontents and sympathisers with the enemy. Such demagogues are threatened by knowledge and by informed debate, and their antipathy to either has not infrequently reached the level of paranoia, as they see conspiracies in every failure of people to bend automatically to their will. They betray everything they claim to stand for.

The betrayal is no abstraction. The actions of Bush and his ilk only provoked more resentment and more extremism. This has continued the cycle of violence on both sides. The Bush response was the response of the bully boy - when you are unexpectedly hurt, lash back mindlessly. Bullies are cowards at heart. They act out of fear, the fear that the world is a threatening place, and if they don't put up a tough facade they will lose.

The lesson applies very broadly, to international relations and to personal relationships. We increase our security not by attacking an adversary but by acting to reduce our adversary's fear. This does not mean being passive in the face of imminent attack, nor does it mean appeasement. It means being clear that some actions may promote the chance of an attack, whereas others may reduce it. This, perhaps, is the lesson in Christ's admonition to turn the other cheek rather than to lash back, a lesson widely ignored, especially at the level of societies and nations.

These thoughts do not at all exhaust the possible changes in societal institutions, structures and values that we might consider. They merely offer illustrations that we are not bound by the past, nor condemned to repeat history. Indeed the societies, and species, that survive for long periods are those that are adaptable, creative and not fixed in their ways.

Civilisation, the recent part of our history in which we developed agriculture to the point where we could live in one place and develop towns and cities, has developed entirely within one of the most stable episodes of global climate, since the end of the last ice age about 11,000 years ago[107]. The climate would eventually have changed anyway, but our present actions on the planet are shifting it very rapidly into a climatic state that has not existed for millions of years, from before humans even existed. We had better cultivate our adaptability.

Environment - slowing and reversing the destruction

Our present economic system is highly destructive of the natural world, so much so that our industrial civilisation is in peril. There is rising awareness of the need to slow the destruction. However such actions as are undertaken are piecemeal, not infrequently reversed, and little attention is paid to the underlying sources of destruction, which proceeds apace. We must aspire not just to destroy the planet more slowly. We must stop the destruction. We can then aspire to begin a long process of reversing the destruction - of healing the natural world so that it, and we, thrive again.

Efficiency

The first step is to use resources more efficiently, so we extract less, and dump less waste. In Chapter 7 mention was made of shifting market incentives so that more efficient use of energy and other resources would be promoted. Very often in projects that involve collaboration, for example, there is no-one looking at the overall efficiency or effectiveness of the resulting building or device. They will look at the immediate cost, which will be minimised, but the longer-term cost is not a concern, because the thing is sold and long-term cost is someone else's problem. Market failures such as this have led to an astonishing level of wastefulness, so that Amory Lovins has been moved to say "Increasing energy end-use efficiency ... is generally the largest, least expensive, most benign, most quickly deployable, least visible, least understood, and most neglected way to provide energy services."[108]

Over the past few decades there has been a proliferation of efficient designs for houses, buildings, cars, factories and household devices. These make it clear that we could considerably reduce our use of energy and *save money at the same time*. For a modest investment, with a short pay-back time, we could further reduce energy use to half or less of present use[109]. This means that reducing emissions of greenhouse gases need not be hugely expensive, and certainly will not wreck economies. We could also dramatically reduce our use of other resources. In fact there are serious prospects of moving to a new kind of economy in which resources are recycled perennially instead of being mined, used once and dumped.

The key to such ambitious claims is integrated design. Whether it is for a refrigerator, a house, a factory or a city, a well-integrated design can achieve much greater efficiency than a design in which efficiency was not a consideration from the beginning. Even today, for example, most house designs are controlled mainly by fashion, block orientation and builders' habits (or standard operating procedure). Having thereby lost many opportunities for efficiency (and comfort), builders add some insulation because they're required to, and try to make up the deficiencies with expensive heating and air conditioning. The result is wasteful because the various elements are working against each other. In contrast, in the cold winters of Germany or the hot summers of inland California and Australia there are houses that require 80-90% less energy than average houses. These houses would cost little more than present, inferior, designs if they became standard practice. They achieve such performance because their designs are well-integrated, so that the various elements work together[108]. In other words the goal of good

design is to achieve *synergies*. When this is achieve, the result is better than the sum of the parts.

Yet the potential of energy efficiency, or of resource efficiency more generally, seems to be invisible to most investors and virtually all policy makers. One reason for this is that energy suppliers are highly influential with governments, and they promote the use of the kind of energy they supply, and denigrate alternatives. There is no rich counter-lobby for energy efficiency.

Another reason is that neoclassical economists believe markets ensure efficiency already, and so any large efficiencies that were available would already have been taken advantage of. There's an old joke that an old economist and a young economist are walking down the street and see a $100 note lying on the ground. The young economist bends to pick it up, but the old economist cautions him that it can't be real. If it were real, he says, someone would already have picked it up.

This neoclassical prejudice deeply distorts public policy. Not only is most economists' thinking channelled by the presumption that markets are efficient, but the assumption is built into their computer models of the economy. The implication of assuming optimal efficiency already applies is that if anything were changed the economy would be less efficient, and costs would be higher. As a result economists until relatively recently routinely reported that it would be very costly to reduce our energy use. But this conclusion was built into their models and their thinking at the beginning. By assuming the economy is at maximum efficiency, they can't reach any other conclusion. However the real world reaches a different conclusion.

Real-world, dramatic efficiency gains

DuPont corporation reduced its greenhouse gas emissions by over seventy percent, and *saved $2 billion* in the process. Five other large corporations reduced their emissions by more than sixty percent and collectively *saved another $2 billion*. A rapidly-growing number of companies and local governments is discovering that efficiency pays[110]. The Rocky Mountain Intitute's Amory Lovins has long championed energy efficiency and offers extensive guidance on what can be done[111]. Advocates of and resources for this approach exist in other countries as well[112].

Between 1975 and 2005 the energy intensity of the U.S. economy (the ratio of primary energy end uses to GDP) decreased by 46%. This came about because of increasing prices of energy, starting with the "oil shocks" of the nineteen seventies. The cost of these savings was equivalent to about $12 per barrel of oil (in 2000 $US), whereas oil prices have recently ranged between $US50 and $US150 per barrel. The energy thus liberated for other uses by this improvement in overall efficiency was *four times* as much as the energy provided by new generation facilities.

It is not uncommon that only 10% of primary fuel energy ends up delivered to an end use (water moving through a pipe, cold beer, a hot shower). This means that any increase in the efficiency with which the delivered energy is converted into the end use compounds into ten times as much primary energy saved. The end-use saving also cuts the capital cost of both generation and delivery (for example the cost of pumps), commonly saving

money as well as energy for those alert to the saving. Remedies can be as simple as straightening convoluted piping, or using fatter electrical wiring[97]. For example, regulations on electrical wiring are concerned with safety, not with efficiency. Contractors will use the thinnest wire allowed because copper wire is expensive, and the minimum allowed wire thickness is that which will not overheat and start a fire. However if the wire were twice as thick electrical energy losses would be substantially and cost-effectively reduced.

Energy savings in the range of 60-80 percent have already been demonstrated at medium to large scales in buildings and in industry, and best practice demonstrates even greater savings. Retrofitting of buildings can have a payback time of only a few years if all potential savings are realised, and proper pricing of carbon emissions would make it even more cost effective. Careful retrofitting can also result in a more pleasant workplace that makes people more productive, and the savings resulting from happy people can be many times the savings in energy costs.

The concept of so-called hybrid-drive vehicles was developed by the Rocky Mountain Institute[111] and placed in the public domain so that no manufacturer would be able to keep the concept off the market. In this design the role of the engine is to generate electricity, and energy is transferred to the wheels electrically. This is more efficient than mechanical transmission, and it also allows the engine to turn off when the car's batteries are fully charged. Hybrid-drive vehicles have already demonstrated 50% fuel savings. Higher savings are predicted for the *hypercar* concept, which combines hybrid drive with new, lightweight, high strength materials to cut vehicle weight and fuel consumption in half again[113]. Although such materials are more expensive, simpler construction methods and mass-production are projected to reduce costs to being similar to present costs.

An even more effective strategy to reduce transportation costs is to integrate residences with workplaces, and thus reduce commuting. Dispersed and locally-integrated retailing would also reduce transportation costs, as would local food production. Highly centralised malls and "big-box" retailing increase driving distances. The better modern European cities are compact, livable and easy to get around in. The Brazilian city of Curitiba has 70% ridership on an efficient, comprehensive bus system carefully integrated with residential development[114]. It cost only 1% of the cost of Sao Paolo's subway. A guiding principle is that transportation is a symptom of being in the wrong place.

Well-designed cities and neighbourhoods don't just save energy. They are more pleasant and fulfilling places to live. Less time is wasted getting to other places, only to arrive in a huge parking lot. At a Smart Growth conference in the US, one person reports[115]

> When people talked about walking, though, they seemed to meet almost instinctively on the same page. There wasn't a big focus on how walkable neighborhoods are a benefit to the climate, public health, and public safety. Everyone here seemed to understand that already. Instead, people talked about how they simply *liked* being in places that were built to the scale of people, not autos.

A world built for people, not cars. Visiting aliens could be forgiven for thinking the car is the dominant species on the planet.

Efficiency combined with renewables

The current discussion of energy is still focussed strongly on alternative production (renewables, nuclear, "clean" coal, and so on). This focus not only misses our best short-term opportunity – efficiency – but misses the compounded benefit of efficiency plus renewables. As energy demand is reduced by efficiency, renewable energy production becomes both more adequate and more cost-effective in terms of cost per task accomplished.

The potential of a strategy combining energy efficiency with renewables has been examined in many studies. For example, a Pentagon-funded report[116] offers a roadmap to wean the U.S. off imported oil by 2040 and *off oil completely* by 2050. Investment of $180 billion over a decade could lead to perpetual savings of $70 billion per year, so the net cost is *negative*. This startling outcome is the projected result of a smart mix of policies and private innovation: government and military purchases targeted to accelerate the manufacture of existing innovative designs and technologies, subsidies to the development of new technologies, removal of perverse subsidies, feebates (fees on inefficient vehicles funding rebates on efficient vehicles), assistance to the poor, who otherwise would remain backwaters of inefficiency, and clear signals to markets promoting private innovation and efficiency. We already encountered some of these policies in Chapter 7. The projected savings also result from more fully accounting for externalised military, social and environmental costs of oil dependency. Much of this analysis transfers readily to other countries.

All resources, not just energy, can be used much more efficiently than at present. The key to radical gains in efficiency, meaning gains by factors of 5 or 10 rather than by 5 or 10 percent, is carefully integrated design. Attention to the end use, and to the many steps in delivering energy, resources or products to accomplish the end use, commonly yield many opportunities for savings using appropriate scaling of devices and eliminating inefficiencies in delivery. The strategy is to define the goal clearly, to tailor the delivery to the end use, and to have every component or stage contributing to the same goal. Synergies can then make the total gain greater than the sum of the partial gains.

Reversing the destruction - cradle to cradle industries

Design integration is taken a step further in the concept of *cradle-to-cradle* design[117]. Crade-to-cradle design allows for the recovery and recycling of materials. The design takes account not only of the cradle-to-grave life of a product, but of its materials' rebirth in a new product. Thus components are designed not just for efficiency while they last, but to be easily recoverable and remanufacturable once they wear out. Germany already requires about 90% of car components to be returned to the manufacturer for remanufacture. The prospect is for an industrial system in which most materials are recycled and reused *indefinitely* (not just once), either through the industrial system or through the organic world. Architect and designer William McDonough calls this movement the Second Industrial Revolution.

17. *Reconnecting*

People like Adam Smith and John Stuart Mill clearly conceived of the economy as a part of society and subordinate to social and moral purposes. For over a century the neoclassical tradition has tried to separate the economy from society, and indeed sees the economy as largely dictating the nature of society. Some extreme expressions of this have emerged, such as Hayek's vision of reptilian individualists, and even the application of so-called rational choice theory to the nature of marriage.

A marriage is not a contract. The basis of a contract is mistrust, and guarding against losing. The basis of love is trust, and it is expressed by giving. Those who imagine marriage to be a contract deserve the epithet *autistic*. (This was the description given in 2000 by Parisian economics students to the abstract mathematical form of economics they were being taught, when they called for *post-autistic economics*[118].)

Cooperation and love are vital to human life. We are social beings. We are individuals, but not isolated individuals. Close, loving relationships are essential to our wellbeing. There is an innate tension between our individuality and the needs of our group. To be human is to be part of a society, and to deny or lose society is to lose an essence of our humanity. Therefore we must cultivate a healthy society around us even as we pursue our individual needs.

We must, therefore, fundamentally re-conceive our economies and their purposes. An economy is the way a society makes its living. The purpose of an economy has to be, simultaneously, to provide for the wellbeing of the members of a society and to provide for the health of that society. As there are many kinds of society, each with its culture, so there can be many kinds of economy, each tailored to support its society and culture. The monoculture is as misconceived in economics as in ecology.

The neoclassical tradition is very much an expression of Descartes' separation of mind and body, of pure thought from the corrupt world. It is an attempt to impose clockwork order on living systems, deriving from a time before the essence of living systems began to be appreciated scientifically. We know better now, scientifically as well as otherwise, so there is no excuse for persisting in this grand experiment in social engineering.

Human beings have by now attained such numbers and such power that we indeed dominate most life on planet Earth. Ironically, many of those who are most wedded to the ideology of dominance are also the most anxious to deny that we are affecting water and air quality, soil abundance and quality, forests, accelerating loss of species, ocean acidity

and the very composition of the atmosphere. Nevertheless it is true, and henceforth our relationship with the natural world, living and non-living, is necessarily one of stewardship.

Our relationship with the natural world is also one of mutual dependence. This dependence is manifest both in complexity and in simplicity. The simple part is that the food we eat all comes from the natural world, the water we drink is recycled and cleaned by the natural world, and the air we breathe is replenished by the natural world. None of our clever technologies has changed this simple fact of our existence.

The complex part is that the natural world itself is dependent, in its present form, on complex webs of relationships among millions of species. Our biologists and ecologists surely are glimpsing only a few of the complex details of those interdependencies, yet what we know already makes the implications clear. One implication is that we cannot know the consequences of our actions, as they rebound through the complex connections of an ecosystem. Another is that as we assault ecosystems, decimating species and causing extinctions at an accelerating rate, we weaken the living world, and as we weaken the living world we weaken ourselves.

We must now move on from the ten-thousand-year adventure of trying to dominate nature. Our victories have always been temporary, as the degraded and desertified state of many of our past victories testifies. We must bring our societies and their economies back into healthy relationship with the natural world. This may sound daunting, but we have many of the means already available to us. What is required is that we recognise and adopt this as a goal, and begin to re-organise ourselves so that our assault on nature slows, and stops. In the process we can also reduce the assault by some of our number on the rest of us.

We have a clear conception of the context of economies: within human societies, which are within the living world. We have a clear conception of their purpose: to nurture all individuals and their society. The performance of economies in this context and role can be improved, perhaps indefinitely, by learning how to better understand and manage them.

The design principles that yield radical efficiency can be applied to economies. Economies can be more carefully integrated so as to create synergies between diverse parts. At present our economy pulls in many different directions as a result of government favours to special interests, or inattention, or blind faith that free markets will do the job. The invisible foot is as likely to operate as the invisible hand. We need to attend to the incentives that apply within markets to ensure they are in alignment with our overall goals.

The most general principle of economic management should be to find the deepest-level point at which the mechanism can be adjusted so as to shift results towards the desired behaviour. The notion of getting more effective responses by going deeper into the economic mechanism is well illustrated by the example of the compact fluorescent light bulbs, in which subsidies were offered progressively further back along the supply

chain. With each step back along the supply chain the effectiveness of the subsidy increased. Another excellent example from Chapter 7 is Interface carpet's shift from selling carpet to providing a floor-covering service. In doing so they reversed their own incentive from maximising material throughput to minimising it. Not only was the market mechanism thereby made more effective, but social and environmental goals were satisfied simultaneously with the economic goal.

A counter-example is that the growth of corporations and globalisation have dramatically reduced the feedbacks necessary for markets to operate properly. If someone in a village market made and sold defective goods, people would stop buying and the maker would have to make them properly or go out of business. Today if you buy something defective from a big-box store you can complain to the manager and demand your money back. But if the store is part of a global chain and the item was made on the other side of the world, what are the chances of the makers being penalised, or the designers fixing the problem? With such shallow, short-range feedbacks, the economy cannot function well.

A different example of judicious economic management would be to introduce transaction taxes in financial markets so as to eliminate most speculation and return them to serving the productive economy. This would weaken undesirable feedbacks that are a major source of instability. This one intervention at a strategic point could have a dramatic and positive effect on financial markets, and because financial markets are so powerful and so dysfunctional the effects would resonate powerfully through the whole economy.

The innovations in ownership and local financing that were discussed in Chapters 9 and 13 are also examples of good economic design. The design of local ownership arrangements is important to the viability and quality of a community. If key facilities and infrastructure are owned by nonresidents then emergent community wealth will drain out of the community. Unless it has vigorous wealth generators it will decline as a community. Even so, individuals with little or no ownership will decline in fortune even if the community as a whole is doing well, so it will be important to ensure ownership is sufficiently dispersed that all citizens are included.

The design of contracts is also a part of economic design, since it can decisively affect the efficiency of many operations. A building contract that pays according to how well the building functions over a prescribed period according to prescribed criteria is more likely to be a long-term success, being energy-efficient and people-friendly, if the contract is well conceived. Similarly a well-designed contract for a block of flats or some local infrastructure can ensure ownership transfers to residents and emergent wealth stays in a community. This will be accomplished if the contract separates ownership of land from ownership of built items and puts a time limit on ownership of the built items.

Thus the kind of economic management we can aspire to is really about good design. Architect and designer William McDonough says that regulation is a symptom of poor design[117]. As system design is improved, the need for regulation should dwindle. Good design is a creative process. There is no simple formula. There are broad principles, but each circumstance is different, especially in something as complex as an economy. This means also that there is no final or "right" answer, because another creative person might

see a quite different approach that is even more effective. The Interface switch from selling a product to providing a service is an excellent illustration of such creativity.

If economic management as a creative process sounds daunting, it should not, because it is a cause for optimism. It means there is no discernible limit, aside from the laws of physics, to improving our economies. The living world has been creating greater efficiencies, and more ways of living, through the action of self-organisation and natural selection, for about four billion years now. It shows no sign of exhausting its possibilities. We can look forward to indefinite improvement in the quality of our lives.

We in the Western democracies smugly act as if we are the culmination of political evolution. Yes, history is dominated by authoritarian rule, many despotic and a few wiser and more benevolent. However, since "we" invented modern representative democracy none of that applies. The people rule, we assure each other, and democracy is spreading around the world.

Except of course that every advance in democracy has been resisted, sidestepped and undermined by those who want the world to be their servant. Modern democracy was invented by some colonial Americans, and a noble endeavour it was. Immediately, however, the common people, who were needed to pull off the revolution, began to be excluded again. The author of the most inspired and inspiring vision of the revolution, Thomas Paine, arguing always for the rights of ordinary people, was sidelined because of his religious beliefs, which were not so exceptional for the times, and died with little recognition or gratitude from his countrymen[119].

A century later the Supreme Court of the United States supposedly ruled that corporations have the rights of "natural persons", although it seems the court never made any such ruling[77]. This can only be viewed as a direct subversion of the revolution. Another century on and the US government is controlled by big money, and the Supreme Court ruled that few limits can be placed on corporate political spending. The media have been owned by the rich for a long time, now democracy and the law are also sponsored by your local friendly global corporation. The other democracies have followed their own paths to a comparable state. Modern democracy is a dry, empty husk of the vision so many fought and died for.

Yet the forms of democracy are there for us to reclaim, re-invigorate, and enhance. The ability of the commercial media to control the flow of information and the terms of much of the debate has weakened a little with the advent of the internet. Perhaps their grip will continue to weaken, as increasingly fast internet undermines the business model not only of newspapers but also of the fixed-schedule broadcasts of all the concentrated media companies. The rule of greed, epitomised by Wall Street, is also being challenged as I write by the Occupy Wall Street movement.

The economic reforms suggested in this book will require political power to implement. As yet there has been no serious attempt to fix the structural problems that brought on the Global Financial Crisis of 2007, so another and greater crisis is highly likely, perhaps led by the dithering fools in charge of European finances at the moment. As not

only the greed but the folly and destructiveness of the money power becomes too big to ignore, its hold on power will weaken. There may well then be a contest between fascists and democrats. Democrats will prevail when and where they can persuade ordinary people to reach for a more prosperous and peaceful life that can continue indefinitely.

If ordinary people gain a fare share of the wealth they help to produce, and if the voices of the self-interested rich and the fearful demagogues are muted, then representative democracy can be re-invigorated. If the range of ideas on offer is broadened to include sensible reform of the economy, of benefit to the many, and if the range of political candidates is broadened to represent all points of view, then representative democracy can function closer to its potential.

We need not stop there. Among the reforms proposed here is a broadening of the kinds of ownership we use. There is no reason businesses cannot be owned by employees, or customers and others with a direct interest in the health of the service it conducts. There is no reason infrastructure and essential services need be owned, or sold off to, narrow private interests. They ought to be owned by those they serve. Distributed ownership ought to be direct, rather than through government as in the socialist model, because government ownership only leaves the entity vulnerable to manipulation by politicians. Contracts for construction can include the progressive transfer of ownership as the builder gains a reasonable return. If those kinds of ownership become widespread, then many more of us will enjoy the benefits not only of a fairer share of profits but also of a voice in the day-to-day business of our society. We will have acted on William Greider's insight: "Democracy itself will always be stunted by the exaggerated political power exercised by concentrated wealth. The problem is not that capital is privately owned, as Marx supposed. The problem is that most people don't own any"[74].

Representative democracy can be improved as well. A perennial problem is that governments, bureaucracies, parliaments and political parties have interests that are not the same as those they supposedly represent or work for. The principle difference is that they have power, even if only conditionally and temporarily in theory. In practice there are many ways in which the branches of government can prolong and enhance their power, and they have been doing so for a long time now.

The American concept of the branches of government exerting checks and balances can be extended. Some systems include an ombudsman whose role is to monitor some aspects of the functioning of government. The network governance model mentioned in Chapter 16 extends this idea by having separate boards or overseeing bodies. One such body might oversee the daily functioning of the governance system. Another might oversee its concordance with constitutional principles. Such bodies, or chambers, would need greater independence, financial and political, from the major power centers of government, and this is not a simple challenge, but it is one worth accepting.

The dominant model of business governance is autocracy, the top-down hierarchy. Yet the network governance model actually developed in the context of businesses, to ensure the enterprise was serving its stake holders well, and using the valuable information they can supply. The potential of sociocracy, also developed within a business enterprise, is not only to give people a chance to offer their opinions of how things should

be, but to enable them to be directly and continuously involved in running things. Thus not only the ownership but the governance of business can be made more democratic.

With these possibilities sketched, we see more clearly the emptiness of the current rhetoric about democracy. Most employment is in large organisations, in which there is very little pretence of democracy. I referred to political democracy as an empty husk, and the proof is in the cynicism and disinterest of most of the population for the political process. It will take time to penetrate this cynicism and apathy. A common attitude is that we all know politicians are liars, it will always be thus and I don't want to waste my time with it. Only as some people begin to experience both political and workplace democracy, and to appreciate their benefits, is the idea likely to spread that we can have a much more democratic society. The whole of society, not just the political tip of the iceberg, can be run much more by the people.

We have the opportunity to reform our economic system, to reduce its worst excesses and to induce it to serve us all more equally and fairly. We may also find the means to slow and stop its destruction of the natural world around us, our miraculous, unique and irreplaceable life support system.

We can go further. We can establish not only a form of representative democracy that gives everyone as least some small say in the running of our societies, but we can extend our democratic institutions to overcome their obvious limitations, even when they work as intended. We can quiet the few voices that have monopolised the megaphones, and give everyone a more equal voice in the conversation that is the life blood of our society. We can cultivate values that preclude the selfish exploitation of others' "weaknesses" for personal gain. We can then seek to involve everyone more directly in the running of their workplace and their living place. We can cultivate values that will reduce conflict among us and reduce our conflict with the living world around us, and that instead increase our tolerance, and the diversity, richness and resilience of our societies.

I am saying these possibilities are there for us if we choose to pursue them. I am not saying they are inevitable or even probable. Nor do I believe life would become instantly rosy if we implemented them. There would still be disputes and conflict unless and until, in the more distant future, the general level of emotional maturity rose. However the level of dispute and conflict could be far less than it has been without life becoming ideal and utopias breaking out around the planet. I am talking about reducing the level of theft and mayhem, and reducing the threat of self-destruction. I am not talking about utopian idealism, though some can be relied on to throw those cop-out labels if you talk about improving the world.

The six nations of the Iroquois, who occupied what is now "upstate" New York in the United States prior to the Revolutionary War, had a Great Council in which their disputes were negotiated and their affairs managed[120]. The Council had been instigated by one individual, who sought to end the state of perennial conflict among the nations. The Council evidently inspired some of the US founding fathers, including Benjamin Franklin and Thomas Jefferson, to include some of their practices in the US constitution, in the form of the checks and balances among the branches of government. Some other features of the

Council, that were not incorporated into the US constitution, are also notable. Although the delegates to the Council were men, they were chosen by the women of each nation. Those chosen had to give away their worldly goods for the duration of their office. One member was appointed whose role was to speak for the interests of the seventh generation unborn.

We can, if we choose, seek to establish a way of life that is based on common decency, generosity and courage, that allows everyone access to a sufficient, dignified and fulfilling livelihood, that has strong communities and resilient societies, that is reconnected with the natural world and, above all, that can persist, and develop, indefinitely. This would be the greatest gift we could pass to the seventh generation unborn.

Appendix A. The Fractional Reserve System

Although banking is moving beyond the fractional reserve system, it still helps to understand how it works. At first sight it is not obvious that new money is created. You have to follow the flow of money for a few steps to see how that emerges.

It is easier to explain if the reserve requirement is actually zero (this would be called a pure credit banking system). We can then look at how a non-zero fractional reserve requirement modifies the process. If you ask your bank for a loan of $100,000, they may loan you the money provided they have $100,000 in uncommitted deposits to cover it. (This may seem like a 100% reserve requirement rather than a 0% reserve requirement, but read on.) If they give you the loan, two things are created simultaneously: $100,000, which could be in the form of a check or a bank account with that amount in it, and a debt (yours) of $100,000. So far, things seem to be in balance, since there is a credit in your account and a balancing debit in the bank's accounts. Now if you pay a builder to build a house for you, the builder can deposit your check in his bank. However, there is no label on this money to say it is borrowed. Therefore, the builder's bank now has simply another $100,000 deposit, *and it is free to make loans against that amount*, just as your bank made a loan against its deposits.

Neither bank restricts the use of the deposits against which the loans are made. In other words the money in those deposits is still free to circulate. This means there is now $200,000 in circulation, and a new debt of $100,000, a debt that you owe. The net effect is that $100,000 in new money is circulating. While this money and your debt notionally cancel each other, the dynamics induced by borrowed money are not the same as the dynamics of saved money. This is because loans can now be made against the $200,000 and the process can repeat. Thus the new money can be compounded into $400,000 of new money, and so on, endlessly. Accompanying this growth in loaned money are ever-increasing levels of debt.

If these transactions were done with real, physical cash, the dynamics would be different. The original $100,000 in deposits would physically be passed to you, then to the builder, and finally to the builder's bank and would therefore not be available to your bank's depositors to spend. Nor would the original deposit be available to loan to someone else. Thus the amount of circulating money would not increase through the process of making a loan. This could be called a 100%-reserve system.

The problem arises in part because most money these days is not physical money, it is simply numbers in computers, and because loan transactions are not accounted for in the same way as cash would be. The potential magnitude of the problem can be seen from the fact that in Britain in 1997 the total amount of cash (called M0) was only 3% of the total amount of money, including loans (called M4). In the U.S., *all* of the money originates as loans, and some of it is converted into cash by the Federal Reserve banks[14,121].

Now let's include the effect of the fractional reserve requirement in the process. In the US, banks are required to hold between 8% and 18% reserves on the loans they issue as "demand deposit" (checking) accounts. Let's do an example where the requirement is for

a 10% reserve, as depicted in Figure 8.1. Suppose the Amity Bank has $100,000 in deposits, it can only lend out $90,000 of it. Suppose it loans $90,000 to Mr. Able, who pays Mr. Builder to build him a house, and Mr. Builder deposits the $90,000 with the Business Bank. Now the business bank can lend out 90% of the $90,000, which is $81,000. If Ms. Careerwoman borrows the $81,000 to buy a luxury car, and Mr. Cardealer deposits this in his Caring Bank, then Caring Bank can loan out 90% of $81,000, which is $72,900. And so on.

This sequence also seems to go on forever, just as it did with no fractional reserve, but the amount of money generated is not unlimited. Mathematicians have worked out that this sequence adds up to a finite amount of money. Let's call the reserve fraction r. So in our example, $r = 0.1$, which is the same as 10%. Then the fraction available to be loaned is (1-r), which we can call l. In our example, $l = 0.9$. If we call the original deposit D (= $100,000), then the total amount of new money (N) created is $D\times(1 + l + l\times l + l\times l\times l + ...)$, and the result of this summation is $N = D/(1-l) = D/r$. So, in our example the total amount of new money is $N = \$100,000/0.1 = \$1,000,000$.

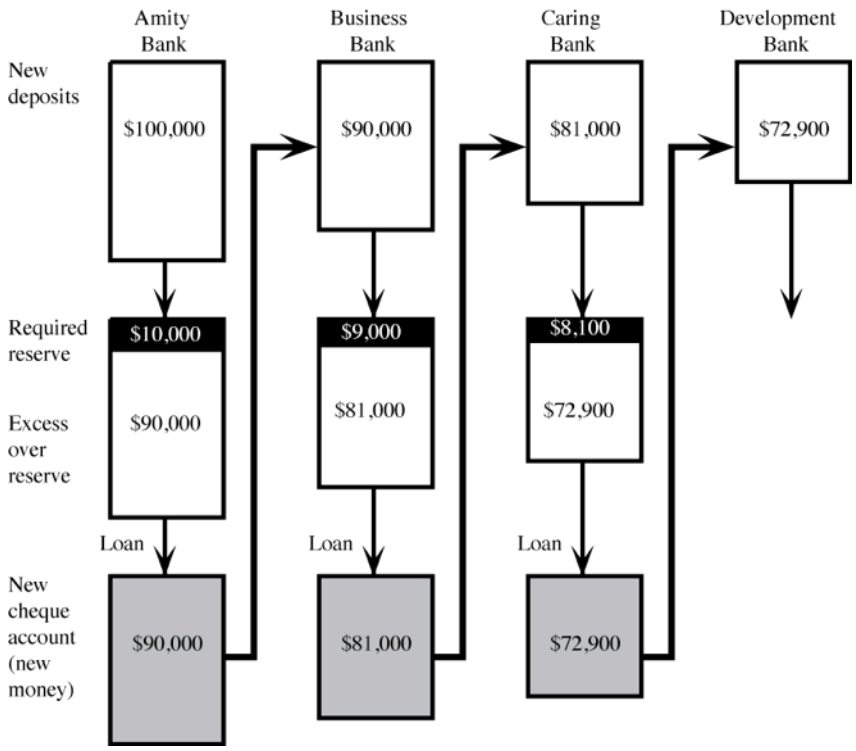


Figure 11.1 The money creation sequence with a 10% fractional reserve. Each time a new loan is granted, new money is created (lowest boxes).

In other words, if the required fractional reserve is 10%, the amount of new money that can be created from the original deposit is 10 times that deposit. If the reserve requirement is 20%, then the deposit can generate 5 times as much new money. If the

reserve requirement is only 5%, then 20 times as much new money can be generated. And so on.

Although the amount of new money that can be generated under a fractional reserve system is not unlimited, it is still a very large multiple of original deposits when the reserve fraction is as low as it typically is today. This means that the money system is intrinsically unstable, just as it was in the early days of banking. If a bank has too many borrowers default on its loans and it goes bankrupt, it can trigger a contraction of the money supply. There are some counterbalances to this instability today, such as the Federal deposit insurance scheme in the U.S., which ensures that depositors do not lose their money. However this scheme basically shifts the risks to taxpayers. This sort of scheme can lead banks sometimes to be reckless in loaning funds, as has happened with the Savings and Loan banks in the U.S. and with much of the banking system in Japan. The end result of trying to prop up an unstable monetary system is to shift the risks and costs to taxpayers and to the economy in general, and to magnify the potential size of an ultimate collapse to disastrous proportions. Far better would be to adopt a money system that did not have a fundamental instability built into it.

Postscript: Relation to Economia

This book has had quite a long gestation, and it is the offspring of my 2004 book *Economia: New Economic Systems to Empower People and Support the Living World*[1], which itself was over five years in the making. *Economia* became quite long, as I saw the need to develop a strong and broad foundation, otherwise it would be more vulnerable to criticism from anyone who was not familiar with any parts of the very broad background of ideas I drew from. As *Economia* grew, I expected there would be a place for a shorter version. However it has been difficult to find a concise way to present such a novel conception, including both a fundamental critique of mainstream economics, in all its incoherence, and also the far more promising alternatives that are now in view.

Anyway here it is. In the meantime the world has developed considerably, but the need for a re-conception of economics has only grown stronger. The need is also, I think, more obvious to more people, so the message is still very timely. *The Beast* is a distillation, extension and update of *Economia*, with the deeper background only briefly summarised. Some important ideas have been clarified. New information and new developments allow some points to be made more concisely or more clearly. Anyone who wishes to explore the subject in greater detail can refer to *Economia*.

There is one caution to make regarding *Economia*. Part 7 on money includes two claims about the effects of the monetary system on the larger economy that I now believe are too strong. First, a mutual credit system (discussed here in Chapters 10 and 14) is not immune from inflation, though I think it is less prone to inflation, and inflation would be more readily manageable because the money supply is much more clearly defined. Second, I have been persuaded by Steve Keen that the amount of money in circulation does not need to exactly balance the amount of debt. I got this idea from Lietaer's parable of the rounds, upon which my *Economia* parable of Financia is based. The reason the claim is not accurate is, in my terms, that a smaller amount of money can circulate faster, as it did in Wörgl, and accomplish the same effect, namely paying off the debt. The tendency of interest charges to increase indebtedness and thereby to force expansion of the money supply may still be there, if the rate of circulation is not responsive to the need to pay off debts, but it will not be a simple relationship. Rates of circulation are difficult to measure, poorly characterised and therefore poorly understood. I'm both reassured and dismayed to learn that Milton Friedman made a similar unjustified assumption in the theory that became known as monetarism – reassured that I'm not alone, but dismayed that I didn't do better than Friedman. I hope my deficiency is remedied in the present version.

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Dr. Geoff Davies is a scientist, author and commentator.

He is a recently-retired Senior Fellow (now a Visiting Fellow) in geophysics at the Australian National University, http://people.rses.anu.edu.au/davies_g/.

He has authored over one hundred scientific papers and two scientific books and has a Hirsch index of 36 (36 papers each with at least 36 citations, indicating significant international standing and influence).

In 2005 he was awarded the inaugural Augustus Love medal for geodynamics by the European Geosciences Union. He was selected in 1992 as a Fellow of the American Geophysical Union.

His most recent scientific book, *Mantle Convection for Geologists* (Cambridge University Press, 2011), won the 2011 Mary B. Ansari Best Reference Work Award of the GeoScience Information Society.

He has long experience in assessing fractious debates on difficult topics. His commentaries have appeared in *The Drum Unleashed*, *Eureka Street*, *The Canberra Times*, *New Matilda*, *Australasian Science* and *On Line Opinion*. He has lectured on New Science and Old Wisdom and Playing With Superfire (the misapplication of technology to biological systems).

In economics, in addition to *Economia* listed below, he has published two papers, as well as several discussions on the blog site of the World Economics Association.

He blogs at http://betternature.wordpress.com/.

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