

Chapter 1

Commercially-produced Money

Let's start by asking the first of the questions identified in the Introduction about the type of money we know best: a typical national currency. Many people will be surprised that the answer to the first question 'Who creates it?', is not 'the government', nor 'the country's central bank', but 'the commercial banks'. Yet there is no conspiracy to hide this fact. In his well-known economics textbook, David Begg states: "Modern banks create money by granting overdraft facilities in excess of the[ir] cash reserves".⁷ He adds: "Bank-created deposit money [the money that people can draw from their bank accounts] forms by far the most important component of the money supply in modern economies."

Dishonest goldsmiths

So how did money creation come to be privatized? This query takes us back to the late middle ages, when gold and silver coins were the main form of money. During this period, if anyone obtained a large amount of coins (more than they felt safe with) then they would deposit them with the local goldsmith, the only person in the area with a reliable strongroom or safe. The goldsmith would give a receipt in exchange. The oldest surviving British record of money being deposited with a goldsmith is dated 1633.⁸ Initially, depositors called at the goldsmith to reclaim their coins whenever they wanted to make a payment, but as time went on some of them found it more convenient to transfer the goldsmiths' receipts instead. Thus, by 1670, receipts frequently had the words 'or bearer' on them as well as the depositor's name. As coins were heavy and risky to carry around, the new receipts quickly became the preferred method of settling bills.

Shortly afterwards, the goldsmiths would have noticed that they had many coins in their vaults which were never taken out. History doesn't record the name of the first goldsmith who was both smart

and dishonest enough to realize that, as it was unlikely that all his customers would present receipts and demand their coins at once, he could make money by lending out a proportion of the coins entrusted to him and charging the borrowers interest on them. Indeed he might not actually have to part with any of the coins at all, because if he gave borrowers receipts with which to make their payments (instead of cash), it would be rare for those who had received the false receipts to bring them in and ask for real money. The only problem was to decide how many such receipts he could issue without being found out if receipt-bearers did actually want to collect coins in exchange. If several receipt-bearers came in a short period, and there wasn't enough gold and silver money in his safe to pay them, he'd be disgraced and forced out of business.

This piece of sharp practice by a long-dead goldsmith laid the foundations of modern fractional reserve banking—the system under which banks maintain reserves of coins and notes in their vaults worth only a fraction of the cash they would have to provide if all their customers came simultaneously to demand the money they were entitled to withdraw. The goldsmith had created purchasing power (in other words, money) by issuing receipts that, in total, involved him in promising to pay out more gold and silver money than he had in his safe. Modern banks create money in the same way, by promising to pay out more paper notes and coins than they possess.

How banks create money

Begg explains how modern banks create money in the following way. He assumes that there are ten banks, each trying to maintain its lending at the point at which the amount of cash held in reserve in its vaults, or with the central bank, is equal to 10% of the amount that its customers could draw out from their accounts. The total amount that account-holders could withdraw (in other words, the bank's liability to its customers) not only consists of their deposits, but also any loan and overdraft facilities that they may have been granted but which they have not yet drawn upon.

If one of the ten banks receives a lodgement of £100 in cash, both the amount of notes and coins it holds in its safe, and the total of its liabilities to its customers, rise by that amount. However, the bank's liability-to-cash-reserve ratio is no longer the 10:1 it wants to

Box 1: How the Bank of England controls the money supply

The explanation of the way banks create money makes it appear that the amount of notes and coins in circulation, coupled with the reserve ratio the banks set themselves, determine the extent of a country's money supply. Actually, this is not quite the case. In most countries, the central bank does not attempt to control the total value of the notes and coins in circulation. In Britain, for example, the Bank of England (BoE) will sell as many notes and coins to the commercial banks as they wish. It simply debits the accounts these banks operate with it by the appropriate amount. So the cash base of the British monetary system is not just the notes and coins that the banks have in their branches, but whatever money they have in their accounts with the BoE as well.

Another minor difference is that it is not the commercial banks themselves that decide the reserve ratio they want to follow, but the central bank to which they report. For example, in Britain until 1981, the BoE specified the total amount of notes and coins a bank must have available at its branches, plus the amount on deposit with it, in relation to the amount of money the bank had created by granting its customers overdrafts and other loans. This meant that if at any time the BoE felt that the amount of money in circulation was too high and was causing inflation, it could force banks to reduce their lending by requiring them to deposit more funds in their accounts. A reduction in the reserve ratio from 20:1 to 10:1 would have halved the total of the amount of money that banks could create.

That system still applies but in a less rigid form. Responding to pressure from the commercial banks (who argued that they would otherwise lose overseas business to foreign banks), the BoE abolished its minimum reserve ratio in 1981. It now agrees a reserve requirement individually with each bank. This reflects both the level of competition the bank is experiencing from its foreign rivals, and the lending and other risks that it is perceived to be running. This change has weakened the BoE's ability to control the money supply by varying the reserve ratio.

The second way that the BoE can control the money supply is by 'open market operations'. These involve the BoE in buying, or selling, interest-bearing bonds. If it sells bonds, the purchasers (financial institutions or members of the public), pay for them by writing out cheques drawn on their commercial bank accounts in favour of the BoE. Subsequently, the BoE debits the accounts that the commercial banks operate with it by the

(Box 1 continued) relevant amounts. Unless the commercial banks make up these debits in some way, the volume of lending they are able to make (and thus the amount of money in circulation), has to be reduced by a figure set by whatever the reserve ratio they had agreed with the central bank. If the ratio were 20:1, their lending would have to be reduced by twenty times the amount of bonds that the BoE had sold.

If the reserve requirement is increased, or the amount in its account with the BoE falls, a bank could maintain its lending by raising more capital and depositing this with the central bank. The new capital could come from selling more shares, or from making a trading profit and paying that to the BoE rather than distributing it to shareholders as a dividend. For many years the Irish commercial banks attempted to justify their huge profits with the argument that they were necessary to enable the banks to lend enough money to finance a rapid expansion of business activity. Profits made by the UK's twelve banks and former building societies quoted on the Stock Exchange are high too. In 1998/9 they totalled £22bn, around £400 for every man, woman and child in the country. If the BoE wants to increase the amount of money in circulation, it can do so by buying up bonds that it, or perhaps a local council, had issued previously.

The third way in which the BoE can control the national money supply is to alter the interest rate at which it lends funds to banks that fail to keep positive balances in their accounts with it. According to an official BoE statement,⁹ this is the main way that the money supply is controlled at present. The technique involves keeping the banking system short of money and then lending the banks the money they need at an interest rate that the BoE decides. The BoE statement explains, "If, on a particular day, more funds move from the private sector [i.e. non-government accounts held in the commercial banks], to the Government's accounts than vice versa, for example because banks' customers are paying their taxes, then the banking system will be short of the funds needed [by the commercial] banks to maintain positive balances on their accounts at the Bank." Alternatively, if the government is spending more than it is collecting, the BoE can create a shortage by selling bonds itself. The Bank then lends the banks the funds they need to keep their accounts with it in credit at a rate of interest that sets the rates at which the banks lend to each other, and to their customers. And that rate of interest, of course, determines how much the banks' customers borrow, and hence the national money supply.

maintain. It has £90 too much cash and if it increased its liabilities by lending £900 to its customers, its desired ratio would be restored. But should it make the £900 loan? What would happen if the person granted the new overdraft drew all £900 out as cash and spent the money in businesses that deposited their takings in rival banks? In this case, the bank's liability-to-cash-reserve ratio would be greater than 10:1, and there would be a risk that the bank might be unable to cash its customers' cheques if an unusual number of them came at the same time—perhaps just before Christmas, when a lot of cash enters circulation.

The only safe course for the bank to take is to lend out £90 rather than £900. Then, if the entire amount gets withdrawn as cash and ends up in other banks, its cash reserve ratio will still remain within the desired limit. In his explanation Begg assumes that the £90 is withdrawn and spent in such a way that all ten banks have an equal amount (£9) deposited with them. He could have equally, and more plausibly, assumed that it ended up with the banks in proportion to their size. No matter, the outcome would have been the same. If each bank now lends out 90% of whatever deposit it has received, that will create further deposits throughout the banking system. And if 90% of that money is lent out too, through an infinite number of lending rounds, then the banking system as a whole (rather than the bank which received the initial deposit) will have generated £900 in loans. This occurs just on the basis of the original reserve surplus of £90 in cash. In other words, the original £100 cash deposit allows the ten banks to increase their loans to the public (and hence the money supply), by £1,000.

So the answer to question one, 'Who creates money?', is that almost all of it is created by commercial banks, although, as Box 1 (pages 18-19) explains, central banks limit the extent to which they are able to do so. Most people find this answer quite staggering. Even bankers do. Lord Stamp, a director of the Bank of England at the time, commented in 1937: "The modern banking system manufactures money out of nothing. The process is perhaps the most astounding piece of sleight of hand that was ever invented." As the economist J. K. Galbraith remarked: "The process by which banks create money is so simple the mind is repelled. Where something so important is involved, a deeper mystery seems only decent."¹⁰

Let's move on to our other questions:

Question 2: *Why do commercial banks create money?* To make profits.

Question 3: *How do they create money?* By granting loans on which interest is paid. This means that almost all the money in a country exists because someone, somewhere, has gone into debt and is paying interest on it.

Question 4: *When do they create money?* Whenever there is a demand for loans at interest rates above that at which they can borrow from the central bank.

Question 5: *What gives the money its value?* This hasn't been mentioned yet, but the answer is purely its acceptability to other people. The value is not guaranteed. No one is standing by prepared to supply a fixed amount of something tangible in exchange, as they were in the days when paper currency could be exchanged on demand for a definite weight of gold. The value of modern money is constantly eroded by inflation. It is backed by nothing at all.

Question 6: *Where is the money created?* In the banks' head offices, wherever those may be. For although decisions on individual loans are made in hundreds of bank branches around the country (and the book-keeping side of money creation is done there too), each branch works within limits and to policies set by its head office. The profits generated by the lending also flow to the head office. Places using bank-created money for trading locally can only obtain money if they are prepared to borrow it on the same terms as other bank customers, or if they can sell goods and services to the outside world to earn money that people in other communities have borrowed. The fact that there is a branch bank in the community means nothing.

A little more discussion is needed to answer the intriguing problems posed by Question 7, namely 'How well does this sort of money fulfil the three functions of money?' and 'What are the consequences of allowing commercial companies to create it in this peculiar way?' The first thing to note is that as bank-created money only exists because people have borrowed it, it will cease to exist if they pay their loans off. This is because when borrowers assemble the funds

they need to repay their loans and lodge them with their banks, those funds cease to be available to other people to use for trading unless the bank lends them out again. The money supply therefore contracts. Consequently, people need to take out new loans to maintain the amount of money in circulation.

Circumstances could easily arise in which they would not be prepared to borrow more, and the economy could plunge into a depression. For example, suppose a crisis overseas caused exports to fall sharply. As redundancies at home increased and people lost their confidence about their future prospects, they might be unwilling to take out new loans. However, if they continued to meet the interest and capital payments due on their existing debts, thereby reducing the total sum they owed, then the amount of money in circulation in the country would fall. Unless 'the velocity of circulation' of money increased (in other words, money moved from account to account fast enough to compensate for the fact that there was less of it about), then the volume of buying and selling going on in the country would also fall. Indeed, this would be bound to happen at some point when the rise in the velocity of circulation of the money became unable to counteract the diminishing supply. There is nothing remotely contentious about this. After all, it is the reason why central banks put up the interest rates at which they lend to commercial banks at the first sign of inflationary pressure. By doing so borrowing is cut, the money supply is reduced (or at least its growth is moderated), and excessive demand is reduced.

Moreover, even if the velocity of circulation did increase to make up for the fall in the amount of money, the ability of businesses to make profits would be reduced. Profits are recorded by businesses that have more assets at the end of a year than at the beginning. These assets can either be goods (finished stock, work-in-progress, raw materials, capital equipment) or cash and accounts receivable. If the amount of money that businesses have in their bank accounts and on their premises falls because the money supply has been reduced, the value of their other assets has to increase by more than enough to offset these falls if profits are to be made. But if firms place tight limits on the amount of raw materials and finished goods they carry in stock, and on customer credit—steps they would automatically take when their bank accounts are low—they will find it

impossible to make profits. Many businesses will start to run at a loss. As a result, few will carry out investment projects the following year. Instead, rather than expanding, firms are likely to attempt to restore their profits by reducing staff. Job losses will become widespread, not just in the companies that would have built and equipped the new developments had the investments gone ahead, but also in the firms that would have made the investments themselves.

Against this background, the public's aversion to further borrowing will grow, especially as, with reduced earnings, many people will be having problems servicing their existing loans. 'Neither a borrower nor lender be' will become a popular maxim again. Even those with money to spend won't rush to do so in view of the uncertainty of the times and the fact that, because firms in distress will be cutting their prices, anyone with money will be able to purchase whatever they need more cheaply later on. This reluctance to spend will slow the circulation of money, effectively reducing the money stock even more. A severe depression will develop, exactly as happened in the 1930s and for the very same reasons.

Fundamental problems

Creating money on the basis of debt, therefore, makes the economic system fundamentally unstable. The system is always balanced on a knife-edge. If bank customers borrow too little, the economy moves into recession and, unless corrective action is taken, the positive feedbacks just discussed (such as people's natural reluctance to borrow and spend) will kick in and produce a catastrophic depression. Indeed, the main reason that a serious depression has not developed in Western Europe and North America since the 1930s is that semi-automatic corrective mechanisms have been unwittingly incorporated into the system. One of these, unemployment pay (and the social welfare system generally), has been a particularly important means of preventing crashes. It has ensured that, whenever the rate of joblessness has increased, larger amounts of money have automatically been transferred to people who spent all of it immediately. This is a very effective way of compensating for the loss of spending power. Another corrective mechanism is that whenever the economy has turned down, many people and firms have been forced to increase their bank debts involuntarily, simply to survive. This has increased

the money supply to everyone else. However, if an economic shock was sufficiently severe, these twin buffering mechanisms would be overwhelmed and a serious depression would develop.

Another fundamental problem with the debt method of creating money is that, because interest has to be paid on almost all of it, the economy must grow continuously if it is not to collapse. Perhaps the best way of explaining this is to use the question asked when gold was the main currency. Since the gold being borrowed did not increase itself and very little was being mined, where was the extra amount of gold to come from to pay the interest when both principal and interest had to be paid at the end of the year? Obviously, as borrowers could only obtain the extra gold they needed by bringing about situations in which others had less, lending money at interest necessarily meant that borrowers either had less gold themselves after paying interest, or that they had impoverished someone else. As either outcome was socially undesirable, both the Roman Catholic Church and Islam condemned usury—all forms of money lending at interest, no matter how low the interest rate—as immoral.

Just because we now use paper currencies doesn't mean that the problem of 'where is the interest to come from?' has disappeared. Borrowers can only obtain enough money to pay their interest bills without reducing the amount of money in circulation if they, or other borrowers, borrow an adequate amount more. As a result, under the current money creation system, the amount of money in circulation has to rise, year after year, by a sum at least equivalent to the amount being removed from circulation by the banks as a result of interest payments. The amount removed is equal to the profits left to the banks after they have paid dividends to their shareholders in the country concerned, invested in new equipment and premises, and met all their wages, salaries and other operating costs there. These profits will be held in accounts in the banks' own names and unless they are put back into circulation by being spent or lent, the amount of money in circulation will fall. As a result, the business sector will show a loss and cut back its investment and borrowing, thus pushing the whole economic system into decline. The only thing to prevent this from happening would be that, by chance, the country's foreign earnings or capital inflow rose by enough to compensate for the interest lost.

The fact that the amount of money in circulation usually has to

increase each year to enable interest to be paid means that the total value of sales in the economy has to go up too if the ratio of the money supply (and thus debt) to the volume of trading is to stay constant. The required increase in sales value can come about in either, or both, of two ways: inflation and expansion. If there is no increase in output during the year, the increased amount of money in circulation could simply push up prices, or allow firms to increase them. This inflation would provide businesses with enough additional income to pay their increased interest bills. The alternative is that the output of the economy grows by enough to require the monetary increase. This is the expansion. Of course the most likely outcome is a combination of inflation and expansion which will restore the balance between the value of trading and the value of money.

This analysis means that, due to the way money is put into circulation, we have an economic system that needs to grow or inflate constantly. This is a major cause of our system's continuous and insatiable need for economic growth, a need that must be satisfied regardless of whether the growth is proving beneficial. If ever growth fails to materialize, and inflation does not occur, the money supply will contract and the economy will move into recession. Politicians naturally do not want inflations and recessions occurring during their periods in office, so they work very closely with the business community to ensure that growth takes place. This is despite the damage that continual expansion is doing, both to human society and the natural world.

The impossibility of perpetual growth

Continuous economic growth is impossible in a finite world. True, some people believe that growth can be made environmentally harmless ('angelized', to use Herman Daly's term) by being stripped of its energy and natural resource content, so that it is capable of being continued indefinitely. But this is a pipe dream. The energy and resource content of many activities can certainly be reduced so that we can do more of them without increasing our environmental impact, but that impact cannot be reduced to nothing. Sooner or later, angelizing efforts will reach a point at which the amount of energy and other resources saved by further improvements in technology have become minimal. This will make further significant

increases in the volume of production impossible without causing additional environmental damage.

So could growth continue endlessly if it was the value of production which increased, rather than its physical volume? Technological optimists suggest that people might be prepared to pay more for goods and services of superior design or performance but the same resource content. However, even moving everything up-market has its limits. After a time, consumers would become unhappy paying extra for increasingly minor improvements.

No part of the economy has been angelized already, not even parts of the service sector. Indeed, once the inputs required (vehicles, buildings, copying machines) are taken into account, this sector might not be much less environmentally harmful than many industrial activities.



Britain's M4, the supply of money created by commercial banks plus the amount of notes and coins in circulation, has grown by twice as much as the country's national income since the early 1980s. The only part of its money supply on which no interest is paid, the notes and coins, has fallen from 7.4% to 3.6% of the total supply in the same period.

“That most services require a substantial physical base is evident from casual observation of a university, a hospital, an insurance company, a barber shop, or even a symphony orchestra,” Daly says.¹¹ In any case, who would want angelized growth if it was not required to keep the economic system from breaking down? It would certainly do nothing for the poor, as Daly points out: “If the . . . expansion is really going to be for the sake of the poor, then it will have to consist of things needed by the poor—food, clothing, shelter—not information services. Basic goods have an irreducible physical dimension.”¹²

The fact is that, if we want to build a sustainable economic system—one that has the potential to continue unchanged for hundreds of years, without consuming the social and environmental resources it needs to operate—we have to give high priority to scrapping a money supply system that collapses if it is denied continuous expansion and not permitted to inflate. Sustainability requires a money supply system that can run satisfactorily if growth stops. Consequently, we need to add an eighth question to our list: ‘Is this money supply system compatible with the achievement of sustainability?’

We can now sum up the performance of the present dominant form of money by answering the last two questions:

Question 7: How well does bank-created money work?

A: As a means of exchange? Since the end of the First World War, it has been extremely rare to have long periods in which the supply of money has been just right for the volume of trading. Either too much money got into circulation and inflation threatened, or too little, resulting in recessions or even a depression. Governments and central banks have devoted a great deal of effort to trimming the monetary controls and, because of the long response times before the

A good store of value?



British consumer prices have gone up by over 600% since 1974.



The exchange rate of the dollar in terms of sterling is now so unstable that it is of little use in planning for the future.

results of their adjustments appeared, they were very likely to over-correct. A money supply system should be fundamentally stable rather than fundamentally unstable, as this one is.

B: As a store of value?

Since 1918, most of the attempts to control the money supply have been intended to enable the monetary unit to serve as a reasonable store of value by preventing, or rolling back, inflation.

These efforts were not

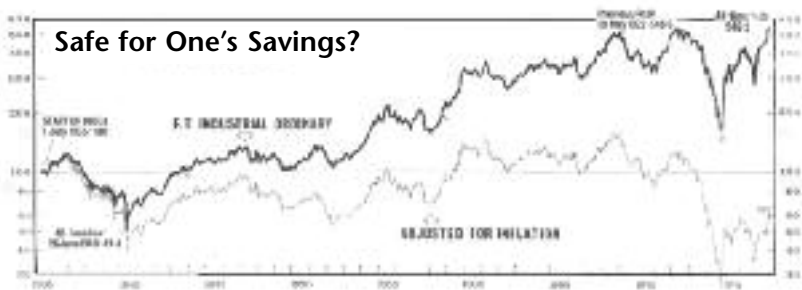
notably successful and resulted in frequent large fluctuations in the value of one national currency in relation to another, often within the space of a few weeks. The record is poor even in terms of what a currency unit could buy within its national borders. The best that money-holders have come to expect within the past decade has been a loss of purchasing power of 3-4% a year. The reason for this gentle (but appreciable) decline is that monetary functions A and B conflict. Thus, if a central bank ever ensures that the store of value function is maintained perfectly, too little money gets into circulation to provide easy trading conditions. This causes profits to decline, investment to fall and the rate of unemployment to rise. Monetary supply management is therefore reduced to securing the least-bad compromise between two incompatible objectives.

C: As a unit of account? The record here is poor in two respects. One is that, because inflation has had to be allowed to take place continually to enable there to be adequate supplies of the means of exchange, it is difficult to make meaningful comparisons between financial results several years apart. The usual method is to convert them all to a common unit (1990 pounds, for example). These con-

versions are not always simple to make because the prices of various components of output, or cost, will almost certainly have changed by different percentage amounts. Even comparing one year's results with the next can be misleading. As a result, retail businesses' annual reports frequently correct a year's sales figures for price changes before comparing them with those of the previous year.

A more fundamental, and serious, problem with the use of modern money as a unit of account is that, as its value has no fixed, guaranteed relationship to anything tangible, it can lead to a gross misuse of resources. Cost-benefit analysis—a technique widely used to compare alternative ways of achieving the same objective over a period of time—shows this well. Suppose the objective is to meet an increasing demand for electricity. For instance, in Finland in 1999 two alternative ways of meeting an increased demand for electricity were being compared. The first was to build another nuclear power plant. The second was to employ people to turn the waste wood left in the forest after timber extraction into wood chips to be burnt in combined heat and power plants.

The costs and benefits of these alternative solutions naturally occur at different times in the future. For example, the nuclear plant would require very heavy spending in the ten years of construction. For 30 years after that, however, the operating costs would be very low and the benefits, in terms of the power produced, high. But after closure, the benefits would stop while the costs of dismantling would continue for over a hundred years and the costs of safe waste storage



For most of the 42-year period between 1935 and 1977, anyone hoping that investing in shares would enable their savings to keep pace with inflation was likely to have been disappointed.

for centuries. The wood waste alternative would involve less capital investment and give a more rapid start to the flow of benefits, but because of the wages of the workers involved, it would have much higher annual operating costs for as long as power was produced.

Analysts attempt to compare such projects by calculating for each cost and benefit the sum of money which, if invested today, would grow to be equivalent to the estimated amount of the cost or benefit in the year in which it occurs. These sums are known as the 'present values' of the benefits or costs. The analysts add up all the present values of the costs of a project and deduct them from the total of the present values of all the benefits. The project that has the greatest surplus of benefits over costs is the one they recommend for adoption.

The interest rate at which the money invested today is assumed to be able to grow is obviously crucial to the outcome of these calculations. Many firms use a rate of 10%, which means that a benefit of £10 million in 25 years' time has a present value of only £1 million today, while £10 million in year fifty is worth only £100,000. In other words, at such an interest rate, the costs of dismantling the nuclear station and storing its waste indefinitely have almost no impact on the result of the calculation. So projects that deliver their benefits soon and their costs far into the future always win. The mathematician, Colin Clark, was able to show this in a famous article.¹³ He worked out that it was economically preferable to kill every blue whale left in the ocean as fast as possible, rather than to wait until the population of the species had recovered to the point at which it could sustain an annual catch. With the nuclear power example, it is even conceivable that dismantling the station and disposing of its waste might consume more energy than the plant gave out during its operating life, but that a cost-benefit analysis wouldn't reveal this.

That's why we need a money that acts as a proper unit of account. Present value calculations are only possible because our money means nothing. If, instead of pounds sterling, the unit of account for long-period calculations represented kilowatt-hours of electricity or even blue whales, people doing cost-benefit analyses would not be able to blithely reduce the value of costs and benefits arising years in the future in the cavalier way they do. To be a satisfactory unit of account, a money has therefore to represent something of real and lasting value. Its value cannot be set, as is modern money's, on an

Box 2: Why does our present money system lead to a long-term misuse of resources?

Because of the type of money we use at present, the prices set by the market at any given moment have nothing to do with long-term values. They are therefore entirely inadequate for determining the development path that we should select. The problem arises because the market is a human construct that works according to rules people have devised for it. Currently, those rules prevent millions of people without money from affecting the price levels in the market. The needs of the unborn cannot be expressed in the market either. Consequently, the prices that emerge from the market merely reflect the immediate wants of that fraction of the world's present population fortunate enough to have the money to be able to express them.

The ideal use of resources over the years can only be assessed in terms of one's objectives. At present, the system's objective is simply to minimize costs from moment to moment in terms of market prices that are largely determined by the current pattern of income distribution. This inevitably leads to a gross misallocation of resources in favour of the present. A key step toward sustainability is therefore to establish a unit-of-account currency which represents absolute amounts of something important to the whole world's population, present and future, rather than current transitory price levels determined by a temporary minority.

infinitely compressible scale. The values that a good unit-of-account currency might represent are discussed in Chapter 4.

Question 8: Is the money supply system compatible with sustainability? No, because it requires the value of production to rise constantly if the ratio of debt to output is not to build up and create loan-servicing difficulties, which might possibly tip the economy into depression. Only economic growth can maintain the debt-to-output ratio on a permanent basis, while simultaneously allowing investment to continue, and thus avoid the crisis that would follow if investment stopped. However, as we discussed, continuous growth is incompatible with a sustainable world.

A second reason for regarding the current money supply system as a barrier to sustainability is that, as it is an inadequate unit of

account, it is difficult, if not impossible, for the economic system to allocate resources properly between present and future uses.

The problems with the present system of money creation can be summarized as follows:

1. The system creates a highly unstable economic climate.
2. The system requires continual economic growth if it is not to collapse. It is therefore incompatible with sustainability.
3. The system is pre-disposed to competition rather than co-operation as, with a limited amount of money in circulation, people and firms have to compete for it in order to survive.
4. The system's money is created outside the communities in which it is used. So money has either to be earned by the export of goods and services from those communities, or borrowed by them. This undermines local self-reliance.
5. The money supplied by the system is not created by the users as, and when, it is needed. Instead, it is created for them by profit-seeking organizations whenever the central bank thinks that inflation is under control. Shortages that prevent people meeting their needs can therefore arise.
6. The money created by the commercial banks does not represent anything real. Thus, an economic system based on its use is an ineffective way of allocating resources in short supply between current uses and those likely to arise in the future. A money system should be developed that represents the world's most critical scarce resource at the present time. People's natural, and constant, efforts to save money would then automatically involve them in saving the resource.