IV

Money and Finance

10

Money

10.1 THE MONEY SUPPLY

Definitions of the money supply

In theory, money is easy to define. It is the stock of assets that can readily be used to settle debts or to buy goods and services. This property, of being easily and quickly exchanged for something else, is known as *liquidity*, and provides a reason for people to hold money, either to enable them to buy and sell goods when they want to, or as a form of insurance against unforeseen events. In theory, therefore, we simply define money as the stock of all completely liquid assets: of those assets which can *immediately* and *costlessly* be used to buy things. In practice, however, it is extraordinarily difficult to translate this theoretical definition into a satisfactory measure of the money supply. There are several reasons for this: it is impossible to draw a clear dividing line between liquid and non-liquid assets; the liquidity of an asset may be different at different times, and under different circumstances; institutional changes may cause changes in the liquidity of different assets.

- ❏ The distinction between liquid and non-liquid assets is hard to make precise, because liquidity is a matter of degree, assets being more or less liquid, rather than simply liquid or non-liquid.

- ❑ An asset's liquidity may vary over time and under different circumstances. Consider the example of a bank account where the bank is entitled to ask for a week's notice for withdrawals. Most of the time the bank may ignore this, allowing customers to withdraw funds on demand, in which case the deposits are very liquid. Sometimes, of if withdrawals are very large, the bank may enforce its entitlement to notice, in which case the deposits are less liquid.

- ❑ Institutional changes cause the liquidity of different assets to change. For example, when building societies were allowed to issue cheque books, their deposits became more liquid.

It is because there is no clear-cut criterion for deciding what counts as money and what does not, that there are so many definitions of the money supply. In addition, institutional changes mean that it has often been necessary to introduce new definitions of the money supply, and to switch from one definition to another. For example, when the Abbey National became a PLC it changed its status from that of a building society to that of a bank (it became subject to the regulations governing banks instead of those governing building societies). There was an overnight increase in those definitions of the money supply (M1 and M3) which included bank deposits but not building society deposits, even though there was no change in the assets held by the public.

The item which appears in all definitions of the money supply is cash (notes and coin) in the hands of the public (i.e. the private sector, excluding the banking system). In addition, because most transactions are now settled without cash, using cheques or other means of transferring funds from one bank account to another, bank deposits have to be included. This, however, is where the problems start, because there are many types of deposit, ranging from sight deposits (payable on demand) on which no interest is paid and on which cheques can be drawn (which should clearly be included in definitions of the money supply) to interest-bearing deposits on which a long period of notice is required for withdrawals, and on which cheques cannot be drawn (which cannot be used to finance transactions, and thus should not be counted as money). In between these two extremes there are many different types of deposit. Different definitions of the money supply are based on different decisions about which types of deposit to include.

The main definitions of the money supply used in the UK are described in Figure 10.1. The starting point is non-interest-bearing

(NIB) M1, which comprises notes and coin held by the public (i.e. excluding cash held by banks) plus deposits that (a) are with banks, (b) are in sterling, (c) can be withdrawn on demand (without giving any notice) and (d) on which no interest is paid. The reason why only sterling deposits are included is that we are normally concerned with money kept to finance transactions within the UK. The presumption is that foreign currency deposits are, where they are not purely an investment, held to finance overseas transactions. If we add interest-bearing sterling bank sight deposits, we obtain M1.

M1 is (apart from M0, which is discussed below) the smallest measure of the money supply. It might be thought that everything included in M1 clearly counted as money, but this is not the case. There are some bank sight deposits which earn interest and on which cheques cannot be drawn. It can be argued that where such deposits are large they must be held as a form of saving rather than to finance transactions. This is the reason why M2, the next definition of the money supply, starts with just the non-interest-bearing component of M1: the part which is clearly being held to finance transactions. To this is added 'retail' sterling deposits, these being defined as deposits on which cheques can be drawn, deposits under £100,000 and with less than one month's notice of withdrawal. Because the distinction between banks and building societies is becoming increasingly blurred, deposits with both banks and building societies are included. There are two things to note about this definition of M2. (1) It includes some time deposits (where notice of withdrawal is required) as well as some deposits on which cheques cannot be drawn. (2) Because it includes building society deposits M2 can be larger than M3 (which includes only bank deposits).

Proceeding down from M1 in figure 10.1 we come to M3. Like M1, this includes only bank deposits (as well as cash), but unlike M1 it includes all sterling bank deposits and certificates of deposit. Certificates of deposit are like bank deposits, the difference being that the bank provides the depositor with a certificate, ownership of which can be transferred from one person to another. In that it comprises cash in circulation with the public, plus all sterling bank deposits, M3 is the most straightforward definition of the money supply. When the difference between banks and building societies was very clear cut, with each engaging in different types of business, and with little competition between the two types of institution, there was some rationale for using M3 as a measure of the money supply. With de-regulation and the greater freedom given to building societies under the Building Societies Act of 1986, however, the distinction between

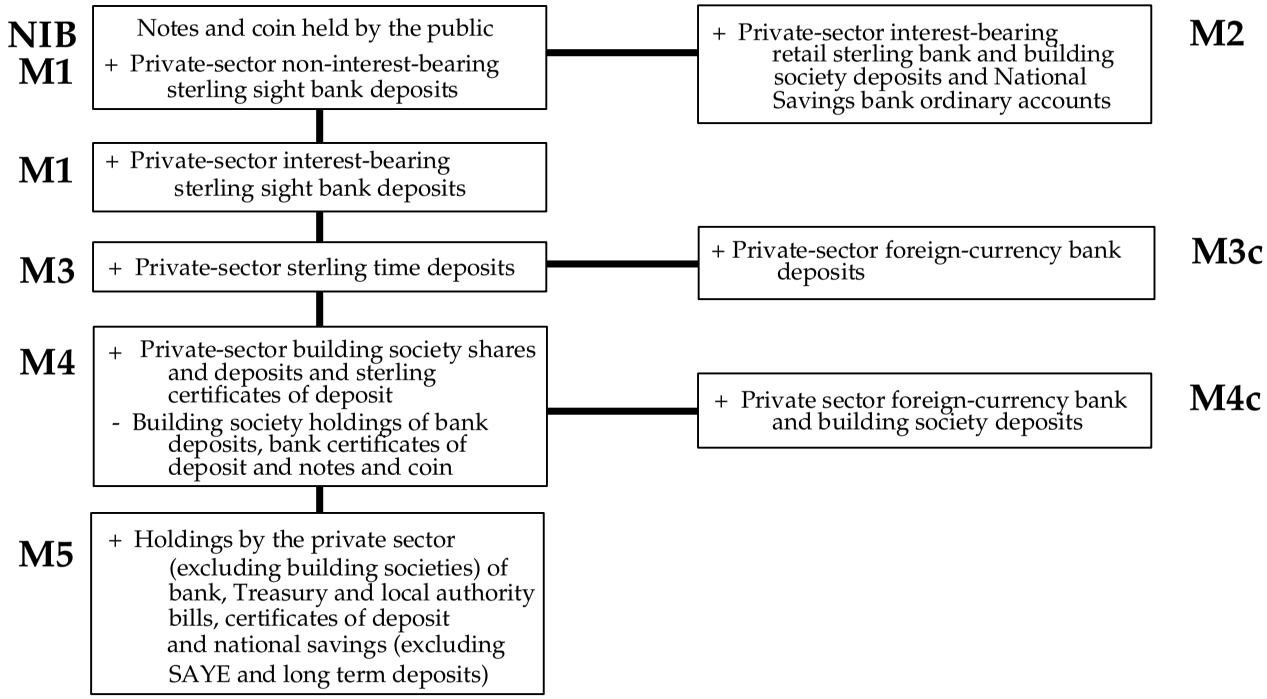

Figure 10.1 UK monetary aggregates

banks and building societies has considerably diminished, and it no longer makes sense to include bank deposits but not building society deposits. It is thus better to focus on M4, which includes all sterling bank and building society deposits. Indeed, since the summer of 1989, with the conversion of the Abbey National into a PLC (and hence from a building society into a bank), the Bank of England has ceased to publish figures for M3.

Figure 10.1 also shows M3c and M4c. These are like M3 and M4, except that they include foreign currency as well as sterling deposits. The reason why building societies' holdings of cash and bank deposits are subtracted is to avoid double-counting. It is worth noting at this point that there was a change in terminology concerning M3 in May 1987. Prior to this what we have called M3 was known as 'sterling M3' (£M3) whilst what is now M3c was known simply as M3. The change in terminology was to bring that for M3 into line with that for other definitions of the money supply.

Finally we have the broadest definition of the money supply, M5. This includes not only bank and building society deposits but also a range of other short-term financial assets. The rationale for this is that many of these assets are, for many purposes, highly liquid, and are held by many firms as a substitute for deposits with financial institutions. Note that M5 was previously known as PSL2, where PSL stood for private-sector liquidity.

The behaviour of the main monetary aggregates is shown in figures 10.2 and 10.3. Several conclusions can be drawn from these figures: that there have been great differences in the behaviour of different financial assets; that the rate of growth of the money supply has at times fluctuated very sharply; that there was a pronounced increase in the average growth rate of most monetary aggregates after about 1970; and that since around 1970 the differences between different measures of the money supply appear to have increased.

- ❑ There are enormous differences between the growth rates of different definitions of the money supply. In 1972-3, for example, M3 and M4 grew at nearly 25 per cent per annum, and M5 grew at over 20 per cent per annum, whereas M1 grew at only around 10 per cent per annum. After this M1 grew more rapidly than M3 and M4 for a few years. The 1980 recession saw a very sharp fall in the growth of M1, and a slight fall in the growth rate of M5, but the growth of M3 and M4 accelerated.

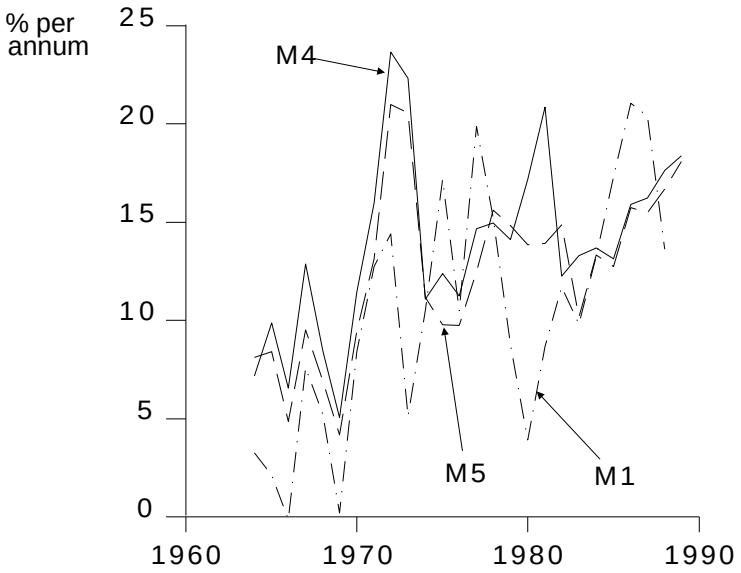

Figure 10.2 Growth rates of M1, M4 and M5, 1964-89
Source: Economic Trends.

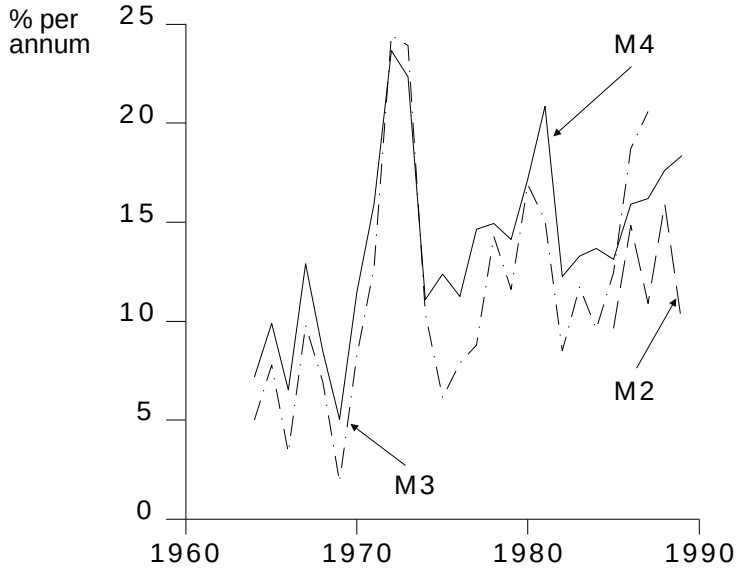

Figure 10.3 Growth rates of M2, M3 and M4, 1964-89
Source: Economic Trends and *Financial Statistics.*

- There have been sharp fluctuations in the growth rate of the money supply, growth rates often changing by as much as 10 percentage points in a couple of years.

- Prior to 1970 monetary growth rates were rarely above 10 per cent per annum, whereas since 1970 the average rate of growth has been closer to 12 per cent per annum, this applying to all five measures of the money supply.

- The divergence between different measures of the money supply appears to have been greater since the early 1970s than before. Until about 1972, though broad measures of money were growing faster than M1, the cyclical pattern appears to have been similar for all monetary aggregates (uncertainty about this arises because there are so few observations in this period). The same cannot be said for the period after 1972. The explanation for this is presumably institutional changes, which started with Competition and Credit Control in 1971.

The velocity of circulation

The simplest way to explore what has happened to the demand for money is to look at the behaviour of the velocity of circulation. This is calculated as the ratio of nominal GDP to the money supply: it measures the volume of transactions financed by each unit of money or, in other words, the frequency with which money changes hands. Although it is conventional to look at statistics on velocity, it is exactly the same as looking at figures on money per unit of output. If demand for money is a proportion, k of nominal income, Py, we will have $M = kPy$. Re-arranging this gives velocity as $Py/M = 1/k$. In examining velocity, therefore, we are, indirectly at least, investigating the demand for money.

Statistics on the velocity of circulation for three definitions of the money supply are given in figure 10.4. The first point to note is that velocity has, whichever definition of the money supply we take, been far from constant. Consider first M4 and M5. There is some evidence that velocity may have risen when monetary policy was restrictive (tight monetary policy means high interest rates which will reduce the demand for money, raising velocity). It rose in the recession of 1970-1; it then fell as the money supply was expanded in the boom years of 1972 and 1973; after which it rose during the recession which followed in 1974-5. Since the mid-1970s, on the other hand, these velocities have

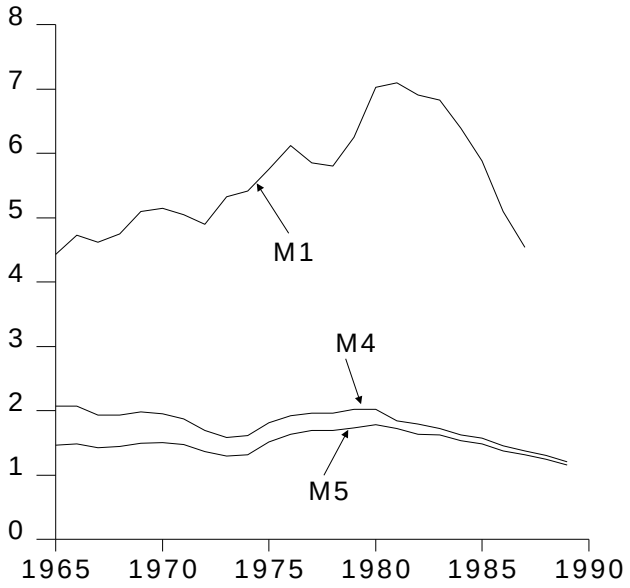

Figure 10.4 The velocity of circulation, 1965-89

Source: calculated using M1, M4 and M5 and GDP at market prices from *Economic Trends*.

not behaved as we would expect: there was no fall in the 1978-9 boom and no rise even during the very severe recession in 1980-1. On the other hand, the fall in velocity since 1981 is what we would expect: the economy has been growing rapidly.

When we turn to M1, on the other hand, we get a very different picture. Up to 1972 the picture is similar to that for M4 and M5, though the fluctuations are larger, but in the 1973 boom, when the velocity of both M4 and M5 continued to fall, the velocity of M1, which had been falling, started to rise. Apart from an interruption in 1976-7, the rise continued until 1981. Up to 1981 the overall picture was of a more or less steady increase in the velocity of M1, from 4.5 in 1963 to over 7 in 1981. Since then velocity has declined rapidly, returning to the level of the mid-1960s within the space of six years.

This evidence suggests that if we are to explain changes in velocity or the demand for money we must look not only at income and interest rates but also at the institutional changes which took place during the period. The main feature of the graphs for the velocity of M4 and M5 is the decline in 1972-3, something that could be attributed to the reforms,

which went under the name of 'Competition and credit control', introduced in 1971, which liberalized the financial system. These reforms caused an expansion of broad monetary aggregates, lowering velocity. Over the succeeding years this sharp decline, which did not affect M1, was reversed.

If we try to go beyond looking at velocity to estimate demand functions for the various definitions of money and to obtain estimates of elasticities of demand, we run into a number of problems. There a very serious identification problem (how do we know that what we have is a demand function, not a supply function or some meaningless hybrid?). Another problem is that we would expect the demand to fluctuate a lot: it depends on expectations and, because it is, by definition, easy to switch between holding money and other assets, the amount of money to hold is a short-term decision that can be changed rapidly as expectations change. Finally, it is hard adequately to take account of the many institutional changes which have taken place, most of which have probably had a major impact on the demand for money. Such institutional changes include changes in the way the financial system is regulated, changes in the roles of different financial institutions (such as banks and building societies) and changes in technology (the spread of credit cards, electronic payments systems and so on).

Thus although demand for money functions have been estimated, they need to be treated extremely cautiously. For this reason, and because it is so difficult to find a simple 'demand' function that fits the data well, no estimates will be provided.

10.2 THE DETERMINATION OF THE MONEY SUPPLY

Money and high-powered money

The simplest theory of the money supply is the money multiplier theory (see box 10.1). According to this there should be a clear relationship between the money supply and the quantity of reserve assets, variously termed *high-powered money* or *monetary base*. This raises the issue of what constitutes high-powered money in the UK. In a primitive banking system where cash means gold coins and where banks held gold as reserves, the answer would be simple: gold. Similarly, if the commercial banks' reserves comprised simply Bank of England notes and deposits with the Bank of England, it would be clear that high-powered money should be defined as the total monetary liabilities of the Bank of England. In a modern banking system,

BOX 10.1 THE MONEY MULTIPLIER

Assume that the money supply (M) comprises cash in the hands of the public (C) plus bank deposits (D):

$$M = C + D.$$

The banking system does one of two things with the money deposited with it: it either holds it as reserves (R) or it lends it to the public as bank loans (L). We thus have,

$$D = R + L.$$

Lastly we define the stock of high-powered money as cash plus bank reserves:

$$H = C + R.$$

So far all we have is definitions. To get a theory of the money supply we need to make assumptions about the behaviour of the public and the banking system. Assume that the public wishes a fraction c of its money holdings to be cash, so that $C^d = cM$. Similarly assume that banks desire to hold a fraction b of their deposits as reserves: $R^d = bD$. It follows that demand for high-powered money is

$$H^d = C^d + R^d = cM + bD$$

$$= [c + b(1 - c)]M.$$

If we assume that supply and demand for high-powered money are equal, we have

$$M = mH \text{ where } m = 1/[c + b(1 - c)] > 1.$$

Here m is the *money multiplier*, which is greater than 1. The usefulness of this theory depends on whether b and c are fairly stable. If b and c are constant we can predict that a £1 increase in H will lead to an increase in M of £m. If, on the other hand, b and c are very unstable and change when H changes, the money multiplier will be less useful in explaining changes in the money supply.

however, commercial banks hold a wide spectrum of assets as reserves, not simply Bank of England notes and deposits. Though many of these short-term liquid assets, readily convertible into cash, are created by the Bank of England or the Treasury, many of them are created within the private sector.

If the commercial banks' lending activities were controlled simply by a single reserve ratio (for example if their only consideration was a legally imposed requirement that they hold x per cent of their liabilities in a specified list of assets) the concept of high-powered money would have a clear meaning. In practice, however, banks are constrained not simply by legal reserve ratios, but by considerations of risk. It is the structure of their balance sheets that matters, not just their holdings of one particular type of asset.

The main measure of monetary base, or high-powered money, that the UK authorities publish is called M0. This comprises notes and coin plus deposits at the Bank of England. It is sometimes referred to as the 'broad' measure of monetary base, the 'narrow' definition comprising merely notes and coin. Despite this, however, it can be argued that M0 is still a very narrow definition of monetary base, for it excludes the bulk of the short-term, liquid assets that commercial banks use as reserves. Only if quantities of these other liquid assets vary in line with the quantity of M0 will M0 be related to the money supply in the way suggested by the money multiplier theory.

Money multipliers for M1, M4 and M5 are given in figure 10.5. This shows that there has been a clear long-term upward trend in all the money multipliers. The multiplier for M1 has more than doubled, whilst that for M4 has increased nearly four-fold. During this period, the rates at which these money multipliers have grown have been very variable, as is shown in figure 10.6, which gives the growth rates of the three money multipliers shown in figure 10.5. The size of the changes in these money multipliers provides an indication of the problem facing the Bank of England, if it were to try to control the money supply through controlling the supply of high-powered money.

The enormous growth in money multipliers means that a large part of the rise in the money supply over the past 20 years has not been caused by increases in the quantity of high-powered money (assuming we define this as M0). This point is made more forcefully by figure 10.6. If we assume that (a) M0 is the right measure of high-powered money and that (b) money multipliers would have been the same had M0 been growing at a different rate (which is admittedly not very likely), the growth rates in figure 10.6 give the rates at which the various definitions of the money supply would have grown had the

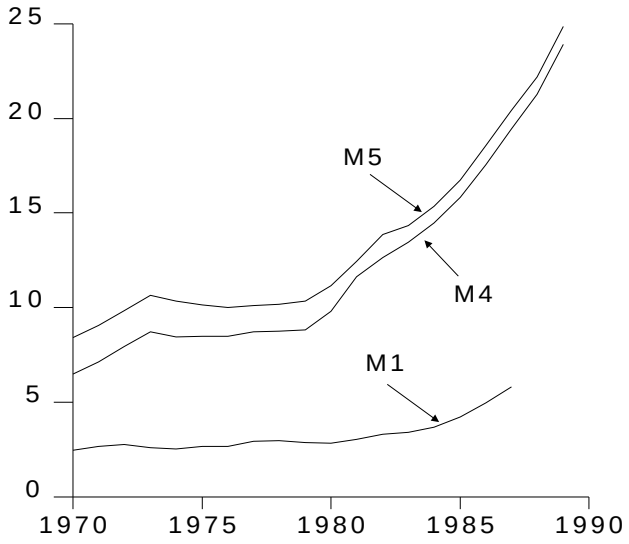

Figure 10.5 Money multipliers for M1, M4 and M5, 1970-89

Source: Economic Trends. M1, M4 and M5 are end-year figures, and M0 is the average for the last quarter of each year.

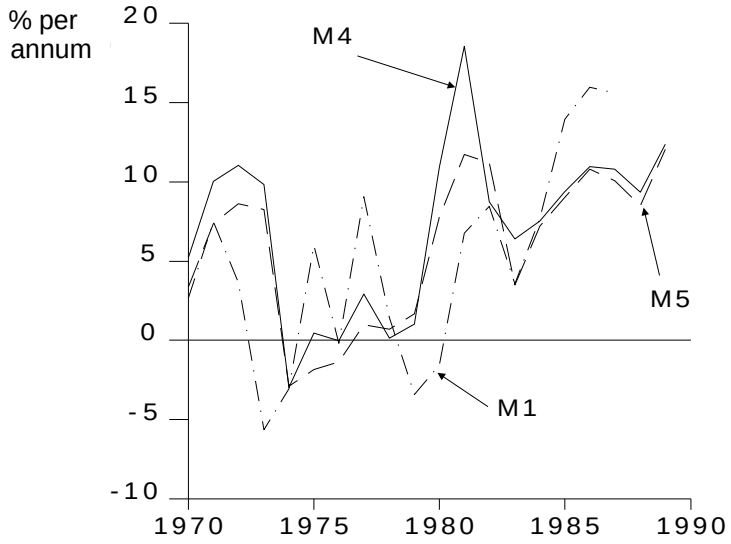

Figure 10.6 Growth rates of money multipliers, 1970-89

Source: as figure 10.5.

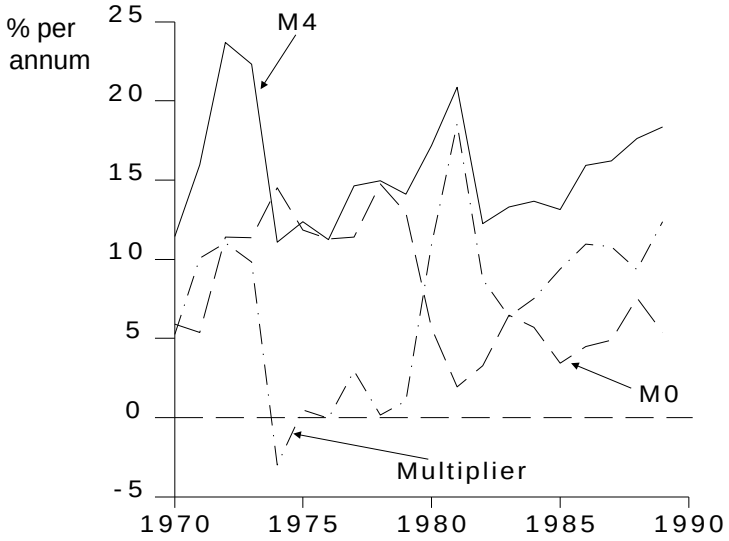

Figure 10.7 The growth rate of M4, 1970-89

Source: as figure 10.5.

stock of M0 remained constant. Thus even if the monetary base (M0) had been kept constant, the money supply would have grown by at least 5 to 10 per cent per annum during the 1980s. In figure 10.7 the growth in M4 is broken down, in this very crude way, into the component 'due to' the change in M0 and that 'due to' a rise in the money multiplier. This shows that although M4 has been growing at around 10 to 15 per cent per annum for most of the past 20 years, it was growth in the monetary base, not changes in the money multiplier, that 'caused' it to grow during the mid to late 1970s. In contrast, during the 1980s changes in the money multiplier (presumably connected with the liberalization of financial markets and other institutional changes) have been more important than changes in M0 in 'causing' M4 to rise. Note that 'cause' has been placed in quotation marks, for accounting relationships such as these cannot show the direction of causation: it may run from M0 to M4, the other way round, or a mixture of both.

The variability of money multipliers makes it clear that if we are to explain the money supply, we must consider other factors. Two things to consider are interest rates and the many institutional changes which have taken place over the past 20 years.

Money and interest rates

For the money multiplier theory to work as a theory of the money supply, with changes in monetary base causing changes in the money supply, it is necessary (a) that the ratios *b* and *c* be independent of changes in the monetary base and changes in the demand for money (the simplest case is if they are constants) and (b) that the quantity of high-powered money be independent of the demand for money. In practice neither of these is true. The most important problem is that the Bank of England does not simply fix the quantity of high-powered money, leaving the markets to determine interest rates. Though it may have targets for monetary base, it buys and sells assets in the financial markets and can influence interest rates as much as the quantity of monetary base.

The policy objectives of the Bank of England are quite complicated in that they have targets for the exchange rate and the money supply. In addition, the government is concerned that interest rates are as low as possible. The two polar cases are *interest rate control* (where the Bank sets a target interest rate) and *monetary base control* (where the Bank fixes the monetary base irrespective of interest rates - note that to achieve strict monetary base control the Bank would have to change its methods of operating in the financial markets: this involves technical issues that we shall not explore here). In either case there is a determinate money supply (see box 10.2). These two cases correspond to horizontal and vertical supply curves for high-powered money respectively. In addition to these polar cases, we have others. For example, if the Bank of England were to fix the interest rate subject to the condition that monetary base fell within a given range, we would have the supply curve shown in figure 10.8(a). If on the other hand the Bank fixed the quantity of high-powered money subject to maximum and minimum interest rates we would have the supply curve shown in figure 10.8(b).

In practice, of course, the range of options open to the Bank of England is even greater than this. They can set targets for any monetary aggregate, not simply for monetary base. In addition, they have a variety of interest rates to which they can respond. The difference is that they have more success in controlling some variables than others. Control over short-term interest rates is easier than control over long-term rates and controlling rates on government securities is easier than controlling yields on equities, because the Bank faces constraints imposed by the markets in which it is able to operate. Under normal circumstances, for example, the Bank of England does

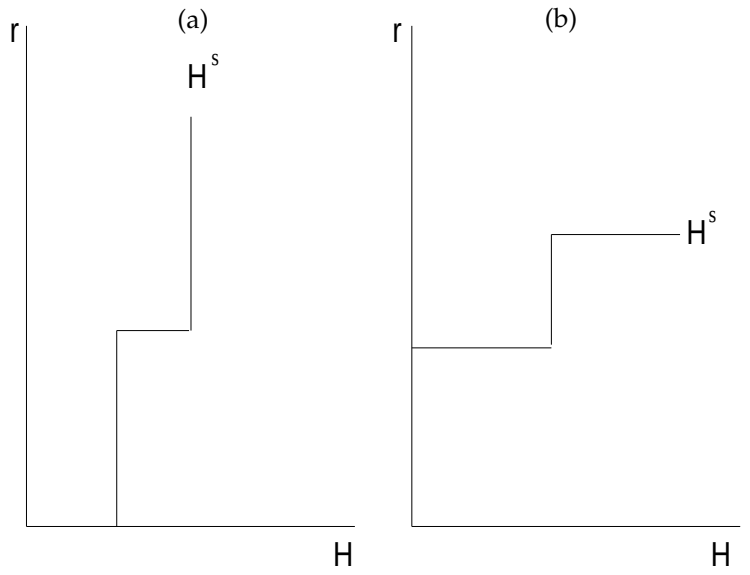

Figure 10.8 The supply of high-powered money

not buy and sell equities. If it wishes to influence this market it has to do so indirectly, operating in markets which will have an influence on equity markets.

Methods of monetary control

Since the 1960s there have been several substantial changes in the way the financial system has been regulated. Prior to 1971 the emphasis was not on controlling the money supply (before 1963 the government did not even compile statistics on the money supply) but on controlling the level of credit. This was done using a variety of methods, including interest rates and quantitative controls on credit. There were restrictions on what banks could lend to various categories of borrower. Hire-purchase regulations (governing, for example, the minimum deposit and the maximum repayment period) were frequently varied as a means of regulating the level of consumer credit. In addition, banks were subject to *two* required reserve ratios. This regime was ended in 1971.

BOX 10.2 PORTFOLIO BALANCE THEORY

Assume that the public has the choice of holding money (M) or other assets (equities, real capital, government bonds etc). Demand for money depends on income (Y) and the rate of interest on these non-monetary assets (r): demand for money rises with income and falls with the rate of interest. If we assume that the quantity of money held by the public is determined by demand (banks always accept money which people deposit with them) it follows that demand for high-powered money will be determined by

$$H^d = (1/m)M^d,$$

where H and m are defined in the same way as in the money-multiplier theory (see box 10.1). From the identity that $D = L + R$ it follows that

$$L^s = D - R^d$$

$$= (M^d - C^d) - R^d$$

$$= M^d - H^d.$$

Using these results we can draw demand curves for money and high-powered money, as in figure 10.B2.1. Assume for the moment that there is a fixed stock of high-powered money, H_1. The supply curve for high powered money is vertical. The equilibrium interest rate must, therefore, be r_1, where $H^d = H^s$. For complete equilibrium, however, it is also necessary that the market for bank loans be in equilibrium. This is shown in the left-hand part of figure 10.B2.1. The *supply* of loans, L^s (the amount that banks wish to lend), is the same as the gap between M^d and H^d. To complete the model assume that the demand for bank loans depends on two interest rates: the rate of interest on bank loans (r^L) and the rate of interest on 'other assets' (r). When r increases (e.g. because lending to the government or investing in real capital becomes more profitable) demand for bank loans will rise. L^d slopes upwards.

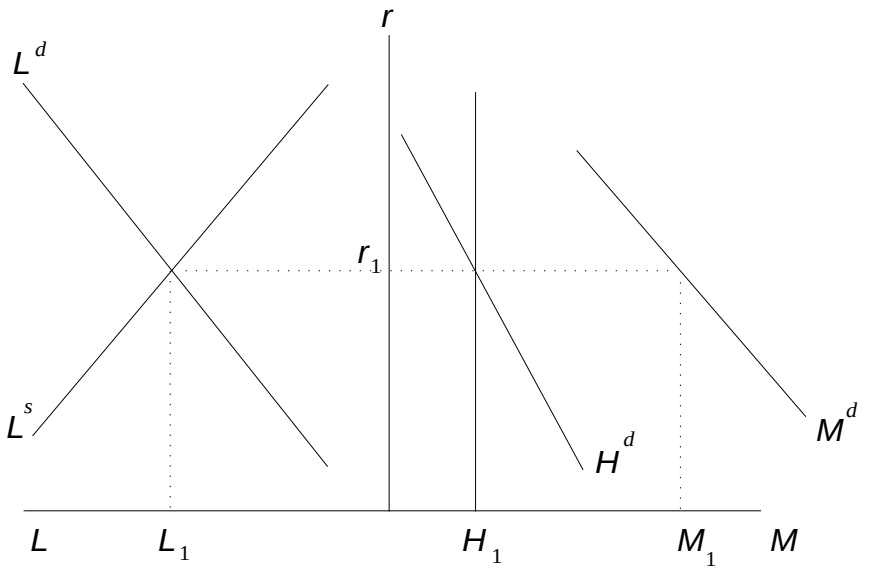

Figure 10.B2.1 The determination of the money supply

Equally important, the position of L^d will depend on r^L: rises in r^L will reduce L^d, shifting the curve to the right. For equilibrium, r^L must be such that $L^s = L^d$ at r_1. Equilibrium in the markets for high-powered money and for bank loans determines two rates of interest: r and r^L.

This diagram can now be used to show a number of things. In figure 10.B2.2 we can see the effects of a change in the quantity of high-powered money. H^s shifts to the right and the equilibrium interest rate falls to r_2. For equilibrium in the market for bank loans L^d must increase, which means that r^L must fall. A rise in H, therefore, leads to a

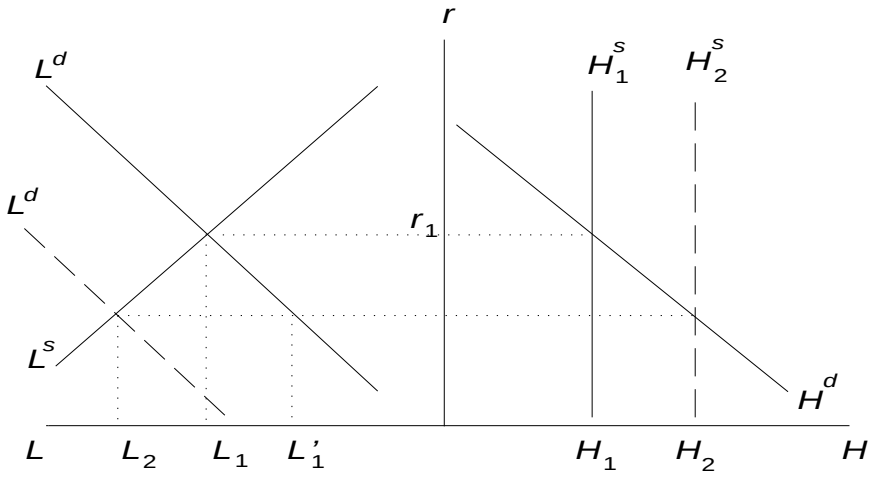

Figure 10.B2.2 An increase in the supply of high-powered money

fall in both r and r^L and to a rise in the money supply from $H_1 + L_1$ to $H_2 + L_2$.

Figure 10.B2.3 shows the effects of a rise in the demand for money (suppose, for example, income has risen) under two assumptions: (a) that the quantity of high-powered money is fixed and (b) that the quantity of high-powered money is completely elastic at rate of interest r_1 (that the interest rate is fixed, either by the government or by international capital markets). In case (a) the result is a rise in both interest rates, with no change in the money supply. In case (b), on the other hand, the quantity of high-powered money increases in response to demand. In addition, because L^s rises, r^L has to fall in order to cause L^d. The result is a rise in the money supply and a fall in r^L, even though the rate of interest on 'other assets' is unchanged.

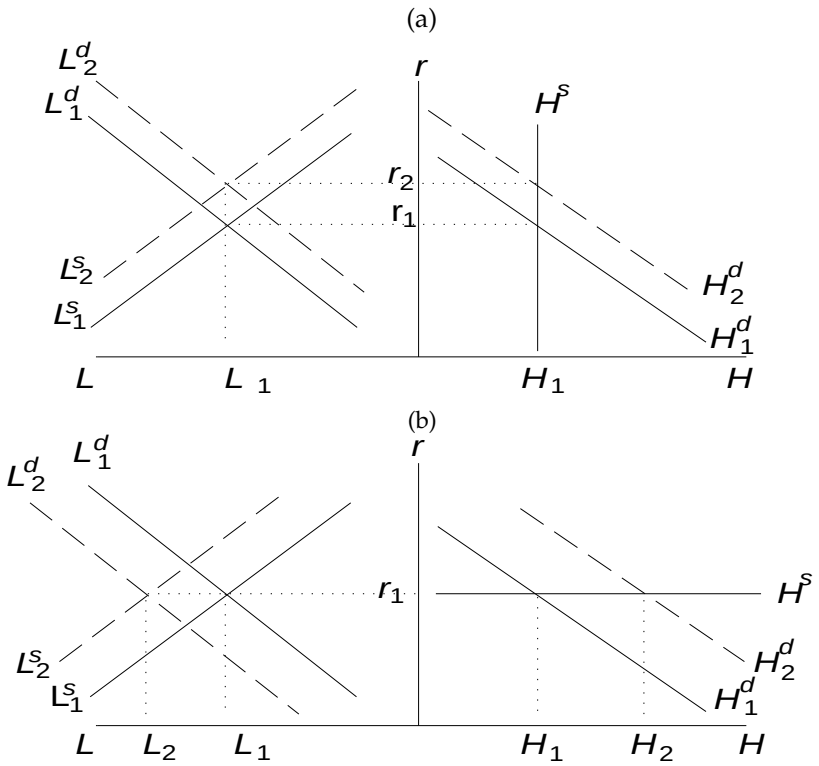

Figure 10.B2.3 A rise in the demand for money

1971: *Competition and credit control*. The aim of this package of reforms was to make the financial system more competitive. It contained two main measures designed to assist the authorities in controlling the banking system.

- ❑ A minimum reserve ratio of 12.5 per cent, to be held in a variety of assets: deposits at the Bank of England; treasury, local-authority and commercial bills; and certain other short-term securities.

- ❑ Special deposits, which the Bank of England could demand from the commercial banks in addition to their 12.5 per cent reserve ratio. The idea was that by asking for special deposits the Bank of England could force the commercial banks to reduce their lending and hence reduce their deposits. The required ratio of 12.5 per cent would prevent the commercial banks from meeting a call for special deposits by running down their reserves.

This is a system that could be understood in terms of the money multiplier theory where high-powered money is defined to include the whole range of assets that counted towards commercial banks' 12.5 per cent reserve ratio. The problem with this method of monetary control was that this 'high-powered money' included many assets that were not under the Bank of England's control. In particular supplies of commercial bills and other very short term assets were determined within the private sector. The private sector could thus create its own reserves. The authorities were therefore forced to control the quantity of reserves through their influence on interest rates: through open-market operations and minimum lending rate. Because of the way reserve assets were defined, the authorities were unable to operate any form of monetary base control — they had to operate a policy of interest rate control (see figure 10.8).

1973: *The 'corset'*. The system introduced in Competition and credit control proved unable to control the money supply. M3, for example, rose by 12 per cent in 1971, 23 per cent in 1972 and 26 per cent in 1973. To increase the authorities' control, ceilings were imposed on banks' deposits. If a commercial bank's deposits grew faster than was permitted by this ceiling it had to hold what were termed 'supplementary special deposits' with the Bank of England. The greater the amount by which deposits exceeded the ceiling, the greater the supplementary special deposits it had to hold. No interest was payable on such deposits. This system was known as the corset.

1981: Attempts to move towards monetary base control. A number of changes were introduced to enable the government to move in this direction.

- ❏ The 12.5 per cent ratio was abolished.
- ❏ In addition to the funds they kept voluntarily at the Bank of England for clearing purposes (about 1.5 per cent) the commercial banks were required to keep 0.5 per cent of their liabilities as deposits at the Bank of England.
- ❏ The clearing banks agreed to keep an average of 6 per cent of their liabilities as call money in the disount market and to discuss with the Bank of England, in advance, any changes in their policies regarding holdings of liquid assets.
- ❏ Minimum lending rate was abolished, to reduce the Bank of England's role in determining interest rates.

These changes in the way the banking system was regulated provide a possible explanation of the changes in the money multipliers shown in figure 10.5. Competition and credit control resulted in an increase in the multipliers, especially for the broader aggregates, M3 and M5. The corset reduced the multipliers and kept them down; with the abolition of the corset and other forms of deregulation money multipliers were free to rise.

10.3 STOCKS, FLOWS AND CHANGES IN THE MONEY SUPPLY

Some accounting identities

So far in this chapter we have focused exclusively on the *stock* of money: the amount of money in existence at a specific time. In accounting terminology, we have been concerned with money as an item in a balance sheet. An alternative way of approaching the problem of the money supply is to look at *flows* rather than stocks: in other words, to consider the causes of *changes* in the money supply. The value of this approach is that it links changes in the money supply to the PSBR and the balance of payments. The reason for this link between deficits and stocks of assets is that deficits have to be financed. The only way a sector can spend more than it is receiving is through

increasing its indebtedness to other sectors: in other words, by selling financial assets. There is thus an unavoidable link between sectoral deficits and changes in stocks of financial assets. The best way to see the implications of this for the money supply is to consider a few basic accounting identities. The starting point is the need to finance both the government deficit and the foreign exchange transactions implicit in a balance of payments deficit.

- ❏ Government deficits have to be financed in one of four ways: selling bonds to the public; selling bonds to the commercial banks; borrowing from abroad; or borrowing from the Bank of England, thus creating high-powered money. Conversely, of course, government surpluses imply buying bonds or reducing lending from the Bank of England.

- ❏ The balance of payments deficit (the balance for official financing) causes changes in the Bank of England's reserves of gold and foreign exchange. This has to be financed.

Starting with the government deficit, we have the following identity.

$$\text{PSBR} = \Delta H + \Delta B_b + \Delta B_p,$$

where ΔB_b and ΔB_p are sales of bonds to the banking system and the public and ΔH is the change in the stock of high powered money.

This is the basic identity linking PSBR to changes in stocks of assets. To turn it into a relationship between PSBR and the money supply we have to bring in the commercial banking system's balance sheet. Assume that banks have the simplified balance sheet shown in table 10.1. Because assets must equal liabilities, we can obtain the following equation:

$$\Delta R + \Delta B_b = \Delta D - \Delta L + \Delta N,$$

where Δx denotes the change in x.

Finally we require the two identities:

$$\Delta M = \Delta C + \Delta D$$

$$\Delta H = \Delta C + \Delta R.$$

Using these we can derive the relationship

$$\Delta M = \text{PSBR} - \Delta B_p + \Delta L - \Delta N.$$

The derivation of this may seem a little complicated, but its meaning is simple. Because of the identity that banks' liabilities and assets must be equal, the rise in the money supply must equal the rise in banks' holdings of government debt (including bonds and reserves of high-powered money) plus their lending to the public (ΔL), adjusted to allow for any increase in non-deposit liabilities (ΔN). The increase in banks' holdings of government debt is PSBR minus whatever bonds the government sells to the public (ΔB_p).

Table 10.1 A simplified Banking Sector Balance Sheet

Assets	*Liabilities*
High-powered money (R)	Sterling deposits (D)
Other public sector debt (B_b)	Non-deposit liabilities —
Sterling loans to the private sector (L)	bank capital etc. (N)

To complete the relationship between the change in the money supply, the government deficit and the balance of payments we have to bring in changes in foreign exchange reserves. There are two complications here. The first is that the government may finance spending by borrowing abroad, thus reducing the need to borrow at home. The second is that there are many foreign currency transactions which, because the money supply is defined as involving *sterling* deposits, must be taken out of the above equation. For example, bank lending in the UK may be financed by foreign-currency deposits, which do not form part of the money supply. Rather than go into a large amount of detail that is not very informative, we will sum up these effects by the term *external and foreign currency counterparts* of the change in the money supply, which covers both external financing of the government deficit plus UK banks' external and foreign currency transactions. We thus have

$$\Delta M = \text{PSBR} - \Delta B_p + \Delta L - \Delta N + EFC,$$

where EFC is external and foreign currency counterparts (ΔL and ΔN refer to sterling transactions, all foreign currency transactions being

included within *EFC*). The first three items on the right-hand side are termed the *domestic counterparts* of the change in the money supply.

In explaining these identities, we have referred to 'the banking system', 'banks' and 'the money supply'. If we define the 'banking system' to include banks and not building societies, we have a relationship between the change in M3 and its domestic and external and foreign currency counterparts. If we define the 'banking system' to include building societies as well as banks, we have the relationship between the change in M4 and its domestic and external and foreign currency counterparts. (Note that when counterparts to the change in M3 were published, changes in non-deposit liabilities were included amongst the domestic counterparts; in recent figures on counterparts to the change in M4, they are not included, but appear as an item separate from both domestic and external and foreign currency counterparts.)

Changes in the money supply

The contributions of the domestic and external and foreign currency counterparts to changes in M4 are shown in figure 10.9. Two conclusions can be drawn from this: that on the whole, changes in M4 have followed the domestic counterparts; and that there is a tendency for domestic and external and foreign currency counterparts to move in opposite directions.

- On the whole changes in M4 have moved fairly closely together with the domestic counterparts. This has been true not only during the period of flexible exchange rates since 1972, but also before that. In other words, it would appear that it is domestic factors that are primarily responsible for monetary growth in the UK. Since 1986 there has been a sharp rise in the domestic counterparts, which explains the rise in the growth rate of M4.

- The domestic and external and foreign currency counterparts tend to move in opposite directions. The explanation for this is the obvious one: tight monetary and fiscal policies (which reduce the domestic counterparts) lead to an improved balance of payments, which in turn leads to a rise in external and foreign currency counterparts. This effect was particularly marked in 1977 when extremely tight monetary and fiscal policies, aimed at reducing the domestic contribution to the money supply, produced a large balance of payments surplus. The result of the balance of payments surplus was that, despite the restrictive policy, M4 grew by more than in 1976.

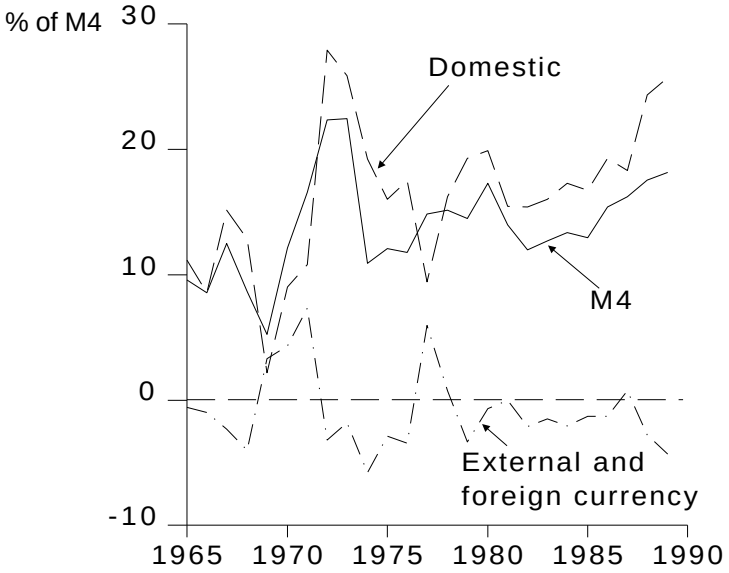

Figure 10.9 Counterparts to changes in M4, 1965-89

Source: Economic Trends.

The main domestic contributions to the rise in M4 are distinguished in figure 10.10. Debt sales are net sales of public sector debt to the public (the private sector excluding banks and building societies, sometimes referred to as 'M4 private sector'). Lending is sterling lending to the public (the 'M4 private sector') by banks and building societies. PSBR rose with inflation during the 1970s and fluctuated greatly. This was offset by increased sales of debt to the public. Since 1983 both PSBR and sales of bonds to the public have declined rapidly. The main source of monetary growth during the 1980s has thus been increased bank lending. Figure 10.10 thus shows that the sources of monetary growth were very different in the 1970s and 1980s: in the mid-to-late 1970s it was a high PSBR that was sustaining the growth of the money supply, whereas since 1980, because of restrictive policy, the government has contributed little towards monetary growth, the stimulus coming instead from the private sector.

The implication of this is that such connexion as there may have been between PSBR and the growth of M4 disappeared during the 1980s. Indeed, as figure 10.11 shows, this link was never very strong. During the 1970s both rose, but this trend can be accounted for by inflation.

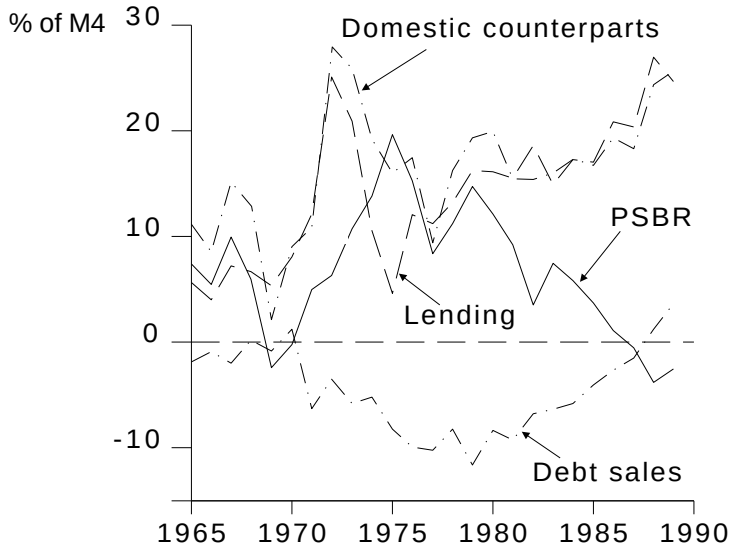

Figure 10.10 Domestic counterparts to growth of M4, 1965-89

Source: Economic Trends. Variables are as defined in the text, as percentages of previous year's M4.

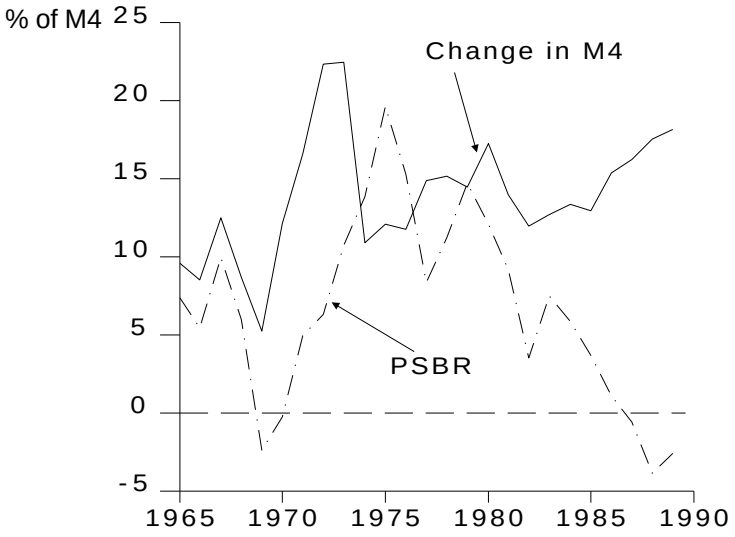

Figure 10.11 PSBR and the growth of M4, 1965-89

Source: Economic Trends. Variables are as percentages of previous year's M4.

During the 1980s it is hard to see any close link, with PSBR (measured relative to M4) falling, and the growth of M4 rising, this divergence being accounted for, as explained above, by increased bank and building society lending to the public.

When using data such as this, it is important to remember that the equations from which they are derived are merely accounting identities: they are not based on any assumption about behaviour and hence can tell us little about causation. For example, if we were to accept a rigid money multiplier theory, with a constant money multiplier, it would follow that changes in the quantity of high-powered money caused changes in bank lending, even though accounting identities used here would attribute part of the rise in the money supply to a rise in bank lending. The fact that part of the rise in the money supply was due to a rise in bank lending would not mean that it had not been caused by government policy. These accounting identities are, nonetheless, useful, for they provide a means of isolating where the main problems lie. For example, these data make it clear that if we are to explain the recent growth in M4, it is important to explain why lending to the private sector has increased so rapidly. For much of the 1970s it would have been much less important to explain movements in such lending, the direct effects of government deficits being more important.

10.4 MONEY AND INFLATION

Our main treatment of inflation is contained in chapter 8. However, because inflation is so often attributed to rises in the money supply it is worth pausing to consider, very briefly, the relationship between money and inflation. The behaviour of inflation and the growth rate of M4 are shown in figure 10.12. There is little evidence in this for any clear link between the growth rate of M4 and either the inflation rate (measured by the RPI) or the growth rate of nominal GDP. There was a dramatic rise in the growth rate of the money supply in 1972-3, followed two years later by a similar rise in inflation, with the result that, looking at this evidence from the late 1970s, there appeared to be some evidence that changes in the growth rate of the money supply affected inflation with a two-year lag. From the perspective of the 1990s, however, it is hard to see such a link. In the early 1980s the peak in the growth rate of M4 came *later* than the peak in inflation, not before it.

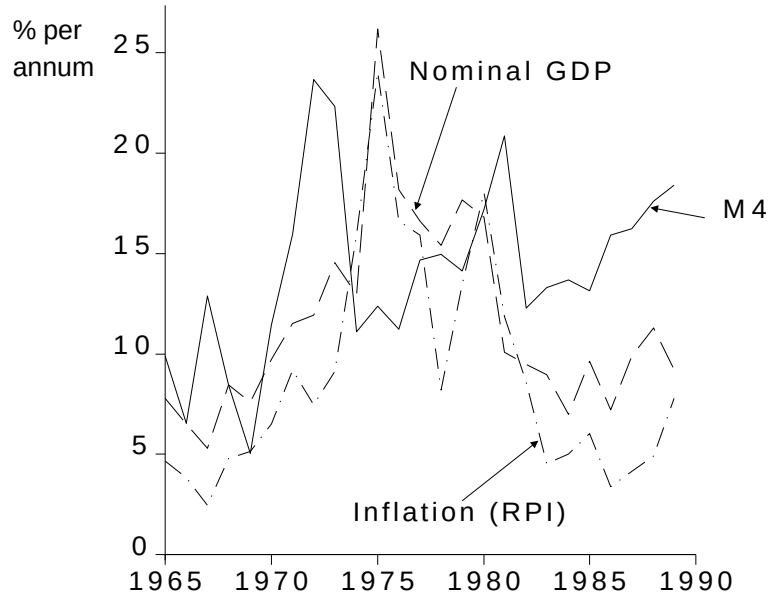

Figure 10.12 Inflation and the growth rate of M4, 1965-89

Source: Economic Trends. GDP is at market prices, average estimate.

FURTHER READING

Christopher Johnson *Measuring the Economy: a Guide to Understanding Official Statistics* (London: Penguin Books, 1988), chapter 7, provides a good introduction to the issues covered in this chapter. Policy is discussed in S. Fischer 'Monetary policy,' in R. Dornbusch and R. Layard (eds.) *The Performance of the British Economy* (Oxford: Oxford University Press, 1987). An interesting recent appraisal of monetary policy is J. C. R. Dow and I. D. Saville *A Critique of Monetary Policy: Theory and British Experience* (Oxford: Oxford University Press, 1988. Paperback edition with new preface, 1990). A critique of this critique has been offered in D. Laidler 'Dow and Saville's critique of monetary policy: a review essay,' *Journal of Economic Literature*, 27(3), 1989, pp. 1147-59. The title of *The Development and Operation of Monetary Policy, 1960-83: a Selection of Material from the Quarterly Bulletin of the Bank of England* (Oxford: Clarendon Press, 1984) is self-explanatory, and the *Bank of England Quarterly Bulletin* should be consulted for more recent developments. Note that many of the references given in chapter 13 are concerned with the appraisal of monetary policy during the 1980s.