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6 Why Money Matters

August this year marks the tenth anniversary of the publication of the celebrated *Radcliffe Report,* which enshrined what had come to be conventional wisdom during the preceding quarter of a century, namely, that monetary policy is unimportant. According to the Radcliffe Committee, the Bank of England can exercise no effective control of the money supply. However, this is of no consequence since the money supply does not play a critical rôle in the economy. What really matters (para. 397) is "the liquidity position of financial institutions and of firms and people desiring to spend on real resources."

Since the 1950s, the testing of hypotheses against the facts has increasingly characterized both government and academic economic studies. Yet, the views expressed in the *Report* were not accompanied by any analysis of the actual behavior of the supply of money or the demand for money in the United Kingdom. Indeed, the *Radcliffe Report* does not contain any series at all on the quantity of money. At the time, there was little empirical research on the influence of money that could provide the basis for challenging the Committee's conclusions. Today, the situation is very different. Extensive historical and statistical investigations have been conducted into the role of money in the United States. These investigations give no support to the views expressed in the *Radcliffe Report.* In the United Kingdom, too, as in the United States, the evidence is that the quantity of money has a significant influence on the level of economic activity.

The next four sections of this article summarize studies bearing on some of the issues posed by the *Radcliffe Report:* Can the central bank control the quantity of money? Is there a direct relationship between changes in the quantity of money and changes in income? What is the link between monetary change and income change? What is the link

between monetary change and financial markets? Most of this relates to the United States, but in a final section some preliminary results are presented of a study of British monetary experience since 1880.

6.1 Can the Central Bank Control the Quantity of Money?

For the United States, the answer to this question is clearly "yes." Commercial banks, the public and the central bank all affect the quantity of money available to be held, but the central bank can dominate the other two. Three factors largely determine the supply of money:

(1) "High-powered money" (sometimes called the monetary base) is provided in amounts determined by the central bank, to serve as "required" and "excess" reserves of the commercial banks and as coin and currency holdings of the public. "Required" reserves relate to the legal minima that the banks have to maintain against demand and time deposits, while "excess" reserves are the amount by which actual reserves exceed required.
(2) The ratio of deposits to reserves is determined by the banks in light of their legal (or customary) reserve requirements, expectations of currency flows and interest rates. Given existing financial conditions, an increase in reserves will induce banks to acquire earning assets, thus increasing their deposits and restoring the desired ratio of deposits to reserves.
(3) The ratio of deposits to currency is determined by the public in light of interest rates, income and its preferences for holding coin and currency.

In the United States, growth in high-powered money has dominated the long-term growth of the quantity of money, the deposit ratios playing a more important role in cyclical changes in the money stock. But, even then, their behavior does not negate the central bank's control of the quantity of money over short periods because it can take action, if it wishes, to offset the behavior of the ratios.

An examination of the circumstances surrounding the major changes in the quantity of money in the United States over the past century reinforces this evidence of the close correlation between high-powered money and the quantity of money over short periods. These major changes in the quantity of money have been largely independent of contemporary changes in business conditions and, since 1914, have clearly been the result of decisions by the Federal Reserve System.

Some economists have argued that central bank control of high-powered money does not confer control over the total quantity of money. They regard an open-market purchase of a certain class of securities by the central bank as having its full effect when some holders of the securities are induced to sell them. But this is only the initial

reaction of the sellers. They sold the securities not to add to their money holdings but as a step toward rearranging their portfolios in light of changed opportunities. The money they receive is a "temporary abode" of the proceeds from the sale, pending the purchase of other items. Money is serving its usual function of separating the act of sale from the act of purchase. Evidence shows that, by this process, the change in high-powered money will be translated by the reactions of banks and the public into a prompt and predictable change in the quantity of money.

6.1.1

The central bank's ability to control the quantity of money does not, of course, mean that changes in it are necessarily the immediate objective of monetary policy. The bank may have other objectives, e.g., maintenance of fixed exchange rates or of fixed prices of Treasury securities. In such cases, the quantity of money must be whatever is consistent with these alternative objectives. In the United States, current policy, for example, aims at keeping certain short-term interest rates within a range specified every three weeks at the Federal Open Market Committee meeting. The Committee instructs the manager of the trading desk at the Federal Reserve Bank of New York to conduct open-market operations that will keep specified interest rates within the indicated range. If this produces too rapid a growth of bank credit, the manager is instructed to allow rates to rise above the range. If it produces too slow a growth, he is instructed to allow them to fall below the range. However, when the Treasury is attempting to issue coupon securities, maintaining prices of Treasury securities within a fairly narrow range may take precedence over maintaining specified limits on the rate of growth of bank credit. In that event, current policy operates to raise the flow of reserves and, hence, the growth rate of the quantity of money above the desired rate in the absence of Treasury financing. As a result, there are periodic reactions by the Federal Reserve System to the cumulative effects of special regard on its part for the Treasury. These periodic reactions involve contraction of the flow of reserves and of the rate of growth of money—as during the last three quarters of 1966, and since the end of 1968.

On balance, while the Federal Reserve can control the quantity of money if it chooses to do so, over the past decade control has been exercised at best fitfully. Most of the time the growth rate has been inadvertent, a side effect rather than the direct objective of monetary policy.

Much the same conclusion apparently applies to Britain. The Bank of England can control the quantity of money if it chooses to do so. However, it has, in general, at least until recently, chosen to supply

whatever quantity of money is necessary to stabilize the prices of the public debt at those interest rates it considers desirable.

An empirical analysis of what determines Britain's money stock, corresponding to that for the U.S. money stock, does not yet exist. One reason is probably the difficulty of assembling detailed data for all commercial banks even yearly, let alone at more frequent intervals. Yet, such an analysis is clearly needed to supplement the theoretical analyses that have demonstrated the shortcomings of the assertion in the *Radcliffe Report* that the Bank of England cannot control the quantity of money.

6.2 Changes in Quantity of Money and in Income

Two dramatic episodes in the United States have recently focused public attention on the relation between changes in the quantity of money and subsequent changes in incomes, which are, of course, the combination of movements in output and in prices.

One episode was in 1966. From April 1966 to January 1967 monetary policy was contractionary: the quantity of money was not permitted to grow, following a year in which it had expanded at the rate of 6 percent. Over the same nine months, fiscal policy was highly expansionary: the federal government's (high-employment) budget[1] shifted from balance to an $11 billions deficit at an annual rate, the deficit then remaining above that level for the rest of 1967. Yet, during the nine months from October 1966 to July 1967 there was a sharp slowdown in both production and prices. Production, which had risen 9.6 percent the preceding year, actually fell 2.6 percent at an annual rate, while consumer prices, which were up 3.7 percent in the preceding year, continued to rise, but at the lower annual rate of 2.4 percent. This episode, like many historical predecessors, suggests that within a few quarters after the onset of a reduction in the monetary growth rate, output will contract and the rate of price rise diminish, despite a highly expansionary fiscal policy.

The second episode began at the end of 1968, when the growth rate of the quantity of money, which had been at the annual rate of 6.8 percent during the preceding 23 months, was reduced to roughly 3 percent at an annual rate. In 1968, while monetary policy was highly expansionary, fiscal policy turned highly contractionary: the federal government's (high-employment) budget, seasonally adjusted, shifted from $16 billions deficit at an annual rate in the second quarter to a small surplus at the end of the year, with the size of the surplus estimated to rise by $5 billions in the first half of 1969. Economists who disregard the quantity of money anticipated a reduction in output and prices after the middle of 1968. None having occurred, they then fore-

cast a slow-down in the first half of 1969 and an improvement in economic activity in the second half. In contrast, economists who stress the importance of changes in the quantity of money anticipated no contraction of economic activity in 1968 or the first half of 1969 and forecast, if anything, a slow-down of economic activity in the second half of 1969. At mid-year, the forecast of the former group of economists had not been confirmed. This episode, again like many historical predecessors, suggests that the effects of a high monetary growth rate will persist for several quarters after it is reversed in raising the level of output and the rate of price rise, despite a highly contractionary fiscal policy.

6.2.1

Apart from these dramatic episodes, many systematic findings support a close association between changes in the quantity of money and those in money income. For the United States, the correlation between year-to-year changes in the quantity of money and those in income for the 94 years from 1870 to 1963 is quite close. The corresponding result for the United Kingdom for the year-to-year percentage changes for 77 years between 1881 and 1967, omitting war years, is, in fact, slightly better.[2] Quarter-to-quarter changes in the U.S. money stock are most closely associated with changes in income when they precede the latter by two quarters. In principle, this association might be considerably misleading: the changes in money and in consumption might be common consequences of associated changes in "autonomous" investment expenditure, investment expenditure, that is, determined independently of current business activity. In practice, this possibility turns out not to be true. A number of statistical studies indicate that money has an influence of its own and not merely as a disguised reflection of such expenditures, whose influence is generally less strong and less consistent than that of money.

6.2.2

A recent study by the Federal Reserve Bank of St. Louis has further documented the close association between changes in money and in income. A statistical test of the relative power of fiscal actions and monetary actions to predict quarterly changes in gross national product from the first quarter of 1952 through the second quarter of 1968 yielded results which indicated that the response of economic activity to monetary actions, compared with that of fiscal actions, is larger, more predictable and faster. Measures of fiscal action tested included federal government (high-employment) receipts and expenditures and the differences between them. The conclusion of the study regarding fiscal actions was that "either the commonly used measures of fiscal influence

do not correctly indicate the degree and direction of such influence, or there was no measurable net fiscal influence on total spending in the test period." Measures of monetary action tested included the monetary base and the quantity of money narrowly defined to include coin and currency and current accounts held by the public, and defined more broadly to include also commercial bank deposit (time) accounts. The conclusion regarding monetary actions was that there was a strong relationship between economic activity and measures of monetary action.

Another set of studies has examined a different aspect of the relation between money and economic activity. These studies compare the cyclical patterns of the rate of change in the quantity of money and of general economic activity. Over the past century in the United States, peaks and troughs in the money series precede the corresponding peaks and troughs marking some twenty-odd cycles in economic activity, on the average by 17 months at peaks and by 13 months at troughs with, of course, much variability from cycle to cycle. A different comparison that may be more revealing for periods with sharp trends is between dates when the *level* of the monetary growth rate changes (shifting from a high level to a lower level or from a low to a higher level) and peaks and troughs in general business activity. For this comparison, the money series leads, on the average by 7.5 months at peaks and 4.5 months at troughs, again, of course, with much variability. Similar comparisons have been made for countries other than the United States. These have not been as extensive as those for the United States but the results have been much the same. A third comparison that gives about the same result as the second is between turning points in the rate of change in money and those in the rate of change in income.

These comparisons are, by themselves, not conclusive about the direction of effect. What is described above as the peak of the money series *leading* the subsequent peak of the cycle could equally be described as the peak of the money series *lagging* behind the preceding trough of the cycle. Alternatively, both the money series and economic activity could be the common result of still a third variable, but with money reacting more rapidly. These and similar possibilities have, however, been extensively explored. There is much statistical evidence suggesting that they do not, in fact, account for the observed results, and that these are more readily explained as reflecting the independent influence of monetary changes.

To summarize, cyclical studies indicate that changes in the monetary growth rate are a necessary and sufficient condition for changes in the growth of income over periods covering the different phases of the business cycle. Short-term changes in monetary growth appear to have a major impact on changes in output and only a mild impact on changes

in prices. This is the opposite of the relation found for longer periods. Longer-period changes in money incomes produced by a changed secular rate of monetary growth are reflected mainly in different price behavior rather than in different rates of growth of output.

6.3 The Link between Monetary Change and Income Change

A change in the monetary growth rate creates a discrepancy between the actual money balances the community holds and the money balances it wants to hold. The actions the community takes to try to eliminate this discrepancy create the link between monetary change and income change. To explore the implications of this, it is first necessary to discuss the way people decide how much money to hold.

6.3.1

What ultimately matters to holders of money is the *real* quantity rather than the *nominal* quantity of money they hold. For the community as a whole, the real quantity of money can be expressed in terms of the number of weeks of output to which it is equal. The reciprocal of this measure of the real quantity of money is income velocity, i.e., the ratio of annual income to the quantity of money. The calculation of velocity is made at those prices prevailing at the date to which the calculation refers. These prices are the bridge between the nominal and the real quantity of money. Another way of expressing the real quantity of money is to deflate the nominal quantity by an appropriate index of prices.

It has been shown that the real quantity of money the community wants to hold is determined by two main variables: real income and the yield on assets alternative to money. The demand for money increases as real income rises, because the rise in real income makes possible larger wealth-holding and money is one form in which to hold wealth; and it falls as interest rates rise, because a rise in interest rates makes money a less attractive asset to hold relative to other assets.

There is, then, some fairly definite real quantity of money that people wish to hold under any given circumstances. Suppose that the nominal quantity of money that people hold happens to correspond at current prices to a real quantity larger than that which they want. They will, then, seek to dispose of what they regard as excess money balances. They will try to spend, lend and give in gifts more than they are currently receiving. But one man can reduce his nominal money balances only by persuading someone else to increase his. The community cannot spend more than it receives. The attempt to do so, however, will raise the volume of expenditures and receipts, leading to a bidding-up of prices and, perhaps, an increase in output. With no change in the

nominal quantity of money, the initial excess of money balances will be eliminated, either by a reduction in the real quantity available to hold as a result of the price rise, or by an increase in the real quantity desired as a result of the increase in output.

In the opposite situation, if nominal balances happen to correspond to a smaller real quantity of money than people would like to hold, they will try to spend, lend and give in gifts *less* than they are receiving. As a group, they cannot do so. But their attempt will, in the process, lower expenditures and receipts, driving down prices or output. Even though there is no change in the nominal quantity of money, the initial deficiency in the amount of money balances will be eliminated, either by an increase in the real quantity available to hold as a result of the price fall, or by a decline in the real quantity desired as a result of the reduction of output.

It is clear from all this that, in principle, changes in income can be produced either by changes in the real balances that people wish to hold or by changes in the nominal balances available for them to hold. The evidence suggests that, in practice, changes in the demand for money (desired real balances) occur slowly or are the result of earlier changes in supply, whereas changes in the supply of nominal balances can occur and frequently have occurred independently of any changes in demand.

6.3.2

To describe the link between monetary change and income change does not mean that we know the process of adjustment in detail. The prevailing orthodoxy presumes that a change in the nominal quantity of money must have its impact first on the bond market, an increase in money raising the price of bonds and hence lowering interest rates, while a decrease lowers the price of bonds and hence raises interest rates. These interest rate changes are assumed to reconcile actual and desired money balances. The sequence of events is then traced from financial to non-financial markets. The change in nominal interest rates is treated as leading to a change in investment expenditures—a qualification is often added: insofar as investment expenditures are responsive to interest rate changes—and the multiplier effect of investment expenditures on income as ultimately leading to further expenditures on consumer goods and capital goods.

The prevailing view takes it for granted that changes in the nominal quantity of money are equivalent to changes in the real quantity of money, so that price changes resulting from monetary change play no part in reconciling the demand for money with the change in supply. Only changes in interest rates produce the reconciliation. The more responsive the quantity of money demanded to a given change in in-

terest rates, the less interest rates will have to change to achieve the reconciliation. Similarly, according to the prevailing view, the interest rate is the only link between monetary change and real income. The less responsive is investment to a given change in interest rates, the less will any given change in interest rates affect real income. If, therefore, the demand for money is highly responsive to interest rate changes, while investment expenditure is unresponsive, most of the change in supply of money will be absorbed by a corresponding change in amount demanded, with little effect on real income or prices.

This was the view adopted by the *Radcliffe Report*. By implication, changes in the quantity of money are important only insofar as they lead to changes in interest rates that influence decisions to hold money or other liquid assets. Changes in market interest rates on the liquid part of total wealth relative to the real rates of return on capital in the illiquid other part of total wealth are deemed to be the channel through which changes in spending are transmitted. Hence, interest rates are viewed as essentially the only market variable that reconciles the structure of assets supplied with the structure demanded. Yet, no evidence exists showing that this approach is valid. The correlations between the level of or rates of change in interest rates, on the one hand, and rates of change in nominal income, prices, and output, on the other, are considerably worse than those between rates of change in the quantity of money and these magnitudes.

6.3.3

The alternative monetary analysis that has been replacing the Radcliffe view is based on evidence that a change in the quantity of money is followed by changes in both prices and output. The price changes are one channel of adjustment of the real quantity of money to the change in the nominal quantity. Interest rate changes and real output changes are other channels. When actual and desired money balances are in disequilibrium, flows of every conceivable sort may be affected in the process of altering stocks of financial and non-financial assets to restore equilibrium.

On this alternative view, the particular mechanical sequence from money to bonds to interest rates to investment expenditures and, thence, to income is one, but only one, possible channel of transmission of monetary change to income change. There is no reason to suppose that it is exclusive. A discrepancy between actual and desired money balances may also be eliminated by initial spending effects on all manner of goods and services. Such a discrepancy may affect expenditures on durable and non-durable consumer goods, investment in education, in financial assets of the wide variety available, including not only bonds but also equities, mortgages, life insurance, and so on, and in durable

producers' goods. The effects are then further diffused as demand shifts for current output of goods and services and new sources of productive services. The precise sequence of transmission may well vary from time to time because it depends on the initial points of impact of the change in money. However, the consistency of the relation between monetary and income changes argues that the initial effects are dominated by the more general diffused effects that monetary changes set off.

To complete this account of the relation between changes in money and in money income, some discussion is required of the link between changes in money and the division of the change in incomes between price and output. The most widely held view of what determines this division is probably that it depends on the level of utilization of capacity. When there is much unemployment of men and machines, an income change will be absorbed primarily by increased output, and prices will rise little. When there is high employment and high utilization of capacity, the output change will be moderate and prices will absorb the rest of the income change. Some recent findings indicate that past price experience is at least as important as the rate of capacity utilization in influencing the rate of current price rise. A 5 percent rate of monetary growth tends to mean a more rapid rate of price rise and a lower rate of output growth if prices have been rising at 5 percent per year in the immediate past than if prices have been stable. But past price experience is itself related to earlier monetary growth rates. Hence, this explanation implicitly makes the current division of a change in money income between prices and output a function of the earlier history of monetary change. However, the precise extent of the influence of capacity utilization and that of earlier price experience is still under investigation. Indeed, this issue of the forces determining the division of a change in income between prices and output is perhaps the major gap in our present knowledge of monetary relations and effects.

6.4 The Link Between Monetary Change and Financial Markets

Monetary policy is often examined in relation to its effects on credit rather than on the quantity of money. The chief function of the central bank, on this view, is regarded as the control of commercial bank assets in the form of loans and investments, the terms of credit in the loan market and the yields on a few widely traded securities. The effect of monetary policy on the quantity of money is not given special consideration.

Yet, there are many reasons for believing that the concentration on credit aspects of central bank actions provides an unreliable indication of the thrust of monetary policy. The importance attached to asset

targets of central bank operations reflects the view that the "first" round of circulation associated with asset creation by the banking system needs special attention. Spending consequences of such a first round are assumed to exhaust the monetary effects of changes in assets. Loans to the private sector are deemed to play a crucial role because it is taken for granted that the transactions velocity of such funds is markedly higher than that of swaps of bank deposits for Treasury bills or other securities held by the public. Alternatively, stress on bank loans as the main channel through which banks affect spending sometimes rests on the assumption that the market for credit is fragmented, so that borrowers denied bank loans perforce must abandon or postpone investment plans they wish to finance.

It is conceivable that the first round may exhaust the monetary effects of the change in assets. This would be the case if a change in the supply of money associated with asset creation just equalled a change in the demand for money. However, if a change in supply produces a discrepancy between the public's actual and desired money holdings, there will be future effects in subsequent rounds of circulation, which will escape the notice of a central bank whose targets are restricted to bank assets.

In any event, the link between changes in reserves over short periods and the volume of particular earning assets is quite loose. The distribution of earning assets among liquid assets, other investments and loans is, in the first instance, subject to the banks' control. Similarly, the link between changes in reserves over short periods and changes in interest rates and credit conditions is quite loose. Interest rates and credit conditions are the outcome of the interaction of demand and supply in markets in which the central bank may not participate or, if it does, may not be dominant. Bank assets in the form of loans and investments are a minor fraction of the total outstanding volume of credit. It has been shown that, in the United States, central bank action, measured by the rate of change in money, accounts only in part for the pattern of interest rates with respect to the peaks and troughs in general business, and explains only about a quarter of the cyclical variation in the movements of interest rates. Clearly, central banks exert an important influence on credit conditions, but it is far from being controlling.

Moreover, changes in the volume of particular types of credit or of total bank credit, in credit conditions, in the level of or the rate of change in interest rates provide a poor basis for interpreting the stance of monetary policy. However money is defined, the evidence is clear that it changes at very different rates than do particular types of bank credit or total bank credit. There is no unambiguous measure of credit conditions. They can be described only qualitatively in degrees of ease

or tightness, and the determination of what credit conditions are "appropriate" is equally amorphous. Since interest rates tend to move within a relatively limited range, a common fallacy is to assume that the top of the range is proof of tightness, and the bottom of the range proof of ease. Yet, tightness and ease are relative, not absolute, terms. A high interest rate when demand is strong may not be restrictive, while the same rate with weak demand may be highly restrictive.

6.4.1

Recent studies have shown that, while interest rates are initially lowered by increasing the quantity of money, this action produces income and price effects which will offset the reduction within several months. Conversely for decreases in the quantity of money. That is why we observe rising interest rates during business expansions as a delayed consequence of a higher monetary growth rate and falling interest rates during business contractions as a delayed consequence of a lower monetary growth rate. The initial effects on interest rates of higher or lower monetary growth rates are temporary: they are swamped by the effects of the ensuing increase or decrease in demand for credit and the effects of price anticipations. To the extent that lenders and borrowers anticipate changes in the purchasing power of money, bond prices will tend to be lower and nominal yields higher when prices in general are rising than when prices in general are falling, since the decline (or the rise) in the real value of the principal is a deduction from (or addition to) the nominal interest paid. Hence, central banks will be misled if they regard the level of or change in interest rates as an indication of whether their own actions are expansionary or contractionary.

Though interest rates have some influence on the demand for and supply of money, and though there are undoubtedly some influences running from prices and output to changes in the nominal quantity of money, the weight of the evidence supports the proposition that the rate of growth of the quantity of money is a relatively unambiguous indicator of monetary conditions. A sustained rise in the rate of growth of money means the central bank is creating a monetary expansion on its own or acquiescing in monetary expansion set in motion by the other determinants. Likewise, a sustained decline in the rate of growth of money means the central bank is creating a monetary contraction on its own or acquiescing in monetary contraction set in motion by the other determinants.

In post-war years one target of Bank of England operations has been the clearing banks' advances to the private sector. The object has been to control private sector borrowing by restricting to a given percentage

figure the increase, over some stated period, in the banks' advances, in order to hold down the demand for imports and domestic spending, both of which are assumed to be strongly associated with private borrowing. Recently, control of private advances has been exercised also as a means of curbing the quantity of money. Even if the banks hit the target—or, to use a more exact metaphor, get under the ceiling—control of advances would still be a poor way to control the money supply. The links between advances and the money supply are too loose. To curb the rate of growth of the money supply, the essential requisite is control of the monetary base. This can best be done by Bank of England actions affecting the flow of reserves to the banks.

6.5 British Monetary Experience

Reasonably accurate annual data on the quantity of money in the United Kingdom are available for 1880–1967. Comparable annual data for money income, prices and real income are available for an even longer period. An analysis of long-period movements in these series is now under way at the National Bureau of Economic Research in New York, but at this stage only the basic data in the form in which they are being studied, not the final results, can be presented. But, even from this elementary material, it can be seen that the evidence for the United Kingdom is broadly consistent with that for the United States on the relation between monetary changes and changes in other economic magnitudes.

For a study of long-period movements, it is desirable to remove from the data, so far as possible, the effects of shorter-term movements of business cycles. A standard chronology of British business cycles dating from the mid-nineteenth century until the second world war has recently been extended into the 1960s. On this basis, it is possible to convert the annual data for the United Kingdom into average values of a series over the successive phases of business cycles, the expansion phase running from a cycle trough to a cycle peak, and a contraction phase running from a cycle peak to a cycle trough. The initial phase covered by the money series is the contraction running from a peak in 1883 to a trough in 1886; for the other series, it is the proceeding contraction running from a peak in 1873 to a trough in 1879. The average values for incomes, prices and the stock of money are shown in figure 6.1 plotted in the middle of each phase.

From the chart it will be seen that there is clearly a striking similarity between the course of the lines for the quantity of money and for money income (the correlation is .972). It is, perhaps, not surprising to find the prices and the quantity of money curves moving so closely together

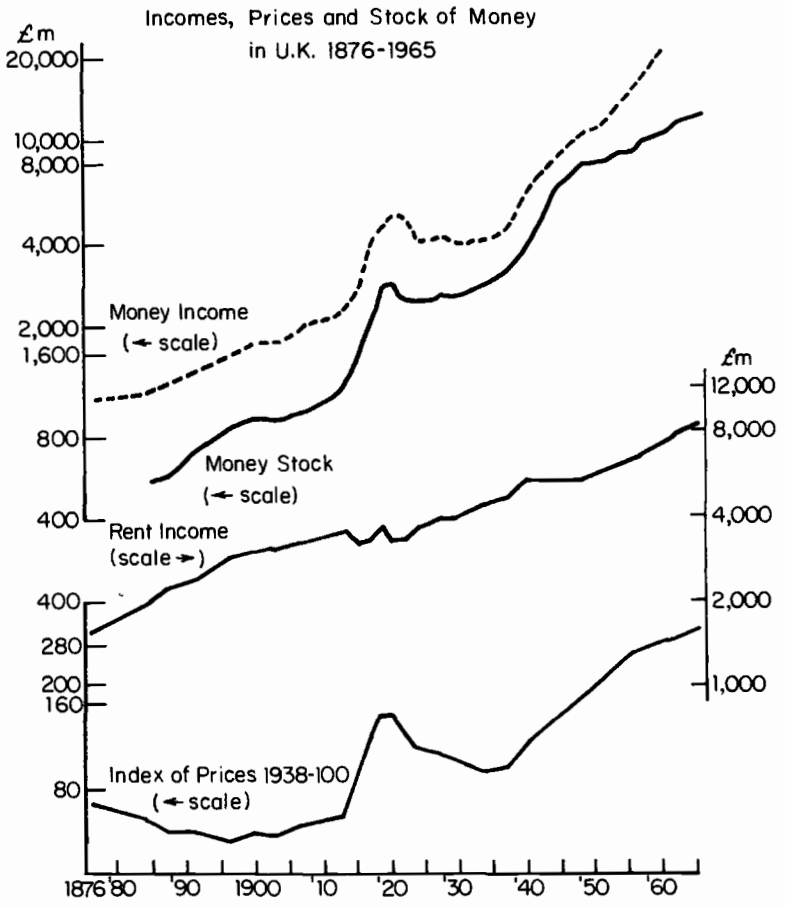

Fig. 6.1 Incomes, prices, and stock of money in the United Kingdom, 1876–1965.

(the correlation is .976). What may be surprising is that, despite the differences in long-period trends, there is an appreciable relation between the levels of money and real income (the correlation is .970).

In addition to the absolute levels of these series, it is helpful to examine their rates of change, as shown in figure 6.2. Rates of change are notoriously erratic. Yet, there is scarcely a movement of any size in the money stock line that does not have its counterpart in that of money income (the correlation is .742). The similarity between the two series does not reflect any spurious correlation arising from reliance on common data, and occurs despite independent errors of measurement in the data underlying the two series. As in figure 6.1, the cor-

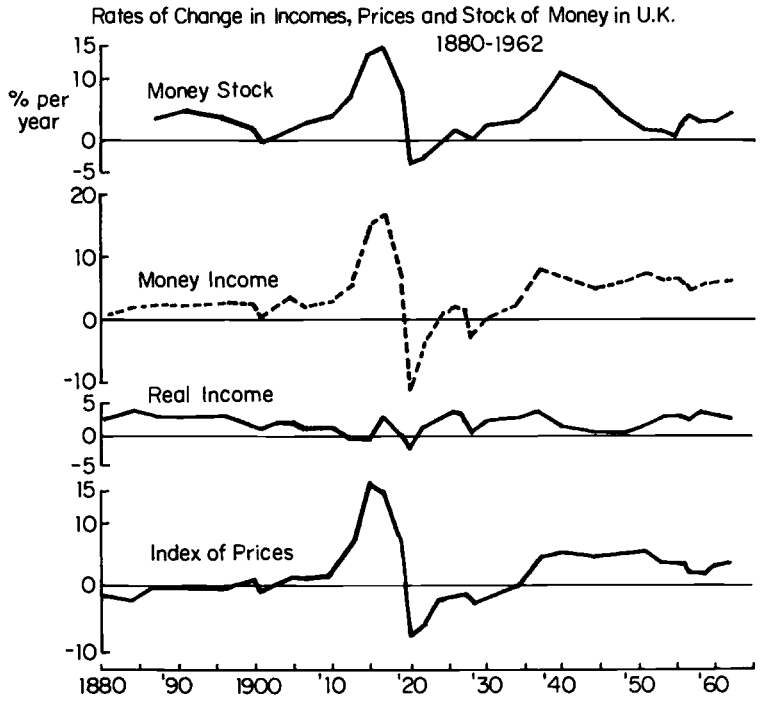

Fig. 6.2 Rates of change in incomes, prices, and stock of money in the United Kingdom, 1880–1962.

relation of the rates of change in money and in prices (.798) is somewhat closer than that between the rates of change in money and in money income. The two war-time peaks in the rate of change in money are reflected in the rate of change in prices. Real income possibly reproduces the first war-time peak in a muted form but not that of the second world war. Omitting the war periods, the correlation between money stock and real income growth rates (.362) is not nearly so good as that between monetary and price change.

The close connection between movements in Britain's stock of money and in money income recorded in the figures is an economic phenomenon that must be explained in economic terms. It is a relation that has persisted for as long a period as there are data to examine, for cyclical as well as longer-term movements. Study of the data for the United States has revealed that monetary influences operate in subtle ways and with long lags, but with highly regular and understandable patterns. There is no reason to believe that British monetary experience is an exception to this conclusion.

Notes

1. Because actual current tax receipts and certain government expenditures (such as unemployment compensation) reflect the level of economic activity at current tax and expenditure rates, the measure of "high-employment" government receipts and expenditures has been devised to reflect the effect of the budget independently of the reverse influence of current economic activity. This measure shows the federal government's receipts and expenditures that *would* occur if the economy were at high employment, a situation in which, but for frictions, all looking for jobs at the going wage rate would be able to obtain employment—in the United States, considered to be when 96 or 97 percent of the labor force is employed.
2. The actual figures are .70 for the U.S. and .77 for the U.K.