

**Does high money growth put the
inflation target at further risk?**

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Tim Congdon is an economist and businessman, who has for over 30 years been a strong advocate of sound money and free markets in the UK's public policy debates. He was a member of the Treasury Panel of Independent Forecasters (the so-called "wise men") between 1992 and 1997, which advised the Chancellor of the Exchequer on economic policy. He founded Lombard Street Research, one of the City of London's leading economic research consultancies, in 1989, and was its Managing Director from 1989 to 2001 and its Chief Economist from 2001 to 2005. He has been a visiting professor at the Cardiff Business School and the City University Business School (now the Cass Business School), and is currently a Visiting Research Fellow at the London School of Economics. He was awarded the CBE for services to economic debate in 1997. Any opinions expressed here are those of the authors and not necessarily those of the FMG. The research findings reported in this paper are the result of the independent research of the authors and do not necessarily reflect the views of the LSE.

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Introduction: high money growth since early 2005

Rapid expansion of money, on the broadly-defined M3 and M4 measures, preceded sharp rises in inflation in the mid-1970s and the late 1980s. The latest surge of money growth in the UK – with the M4 money measure showing an annual growth rate of over 10 per cent since early 2005 – has some resemblances to these earlier episodes and has stirred up old debates. As Martin Wolf remarked in his column in the *Financial Times* on 15th June 2007, ‘Interpreting changes in the growth of the stock of broad money is difficult and, in the UK, extremely controversial’. Indeed, he felt that many economists ‘suffered from a visceral unwillingness to accept that the broad money stock has any significance for inflation’.

Sceptics about the role of money in the inflationary process sometimes claim that the ratio of expenditure to money (also known as ‘the velocity of circulation’) can vary enormously. A celebrated statement on the subject was made in the Report of Lord Radcliffe’s Committee on *The Working of the Monetary System*, which was agreed unanimously in 1959. The Committee’s view was that ‘we cannot find any reason for supposing, or any experience in monetary history indicating, that there is any limit to the velocity of circulation’.¹ The Radcliffe Report’s hostility to a monetary account of inflation was countered by one of the earliest pamphlets from the Institute of Economic Affairs, *Not Unanimous*, edited by Arthur Seldon.² More recently a view not unlike Radcliffe’s has been expressed by Patrick Minford. In his words, ‘Velocity growth is all over the place.’³ Minford’s apparent repudiation of a link between money and inflation is made the more noteworthy by the contrast with his position at the start of the Thatcher government, when he advocated monetary control to defeat inflation.⁴

So two questions need to be answered, ‘are there general reasons why high money growth leads to rapid inflation?’ and ‘what in particular are the risks to future inflation implied by continued double-digit UK money growth?’. The message of the analysis here will be that the desired ratio of money to income (i.e., the inverse of velocity) is a variable amenable to economic analysis, in just the same way as the desired ratio of any good or service to income. Its movements are therefore not arbitrary and erratic, and changes in velocity are not ‘all over the place’. Finally, an examination of changes in the ratio of the UK’s money to its nominal GDP in the 1971 – 2004 period will lead to a quantification of the risks of above-target inflation latent in continued high money growth.

The desired ratio of money to income: some theory

Central to economic analysis are the notions of supply and demand, and their representation in supply and demand ‘curves’ or ‘schedules’. Quantity and price are determined in an individual market (partial equilibrium) by the intersection of supply and demand schedules for the product traded in that market; quantities and prices for the economy as a whole (general equilibrium) are determined when the supply and demand schedules for all products intersect. This is not the place for a disquisition on the role of equilibrium in economics, but – if the usefulness of supply-and-demand analysis is accepted – a few observations immediately become pertinent. First, monetary economics has appropriated the equilibrium idea by saying that national income is ‘determined’ (i.e., reached its equilibrium level) when the demand to hold money balances is equal to the supply of such balances. If the quantity of money is not equal to the demand to hold money, agents take steps (by altering their spending on goods and services, or rearranging their portfolios) to bring them into equality. They keep on doing this – with the resulting impacts on aggregate expenditure and the value of assets – until the quantity of money is equal to the demand to hold it.⁵

The characterisation of economy-wide monetary equilibrium as the successful coupling of money supply and demand ought to be no more controversial than any other kind of supply-and-demand analysis. Further, every demand schedule has two main terms, income and price. If economists agree that the demand for foreign holidays, socks or potatoes is a function of income and price, they should have no ‘visceral unwillingness’ to accept the proposition that the demand to hold money balances is also a function of income and price. Once ‘income’ is an argument in an aggregate money demand function, it must be the case that the equilibrium level of national income changes with the quantity of money. The steps in the argument have the force of logical propositions. Admittedly, there is a little awkwardness in the notion of ‘price’ in the money demand function, but its replacement by some such phrase as ‘expected rate of return relative to a competing assets’ or ‘the opportunity cost of holding money’ ought to be adequate and unremarkable.

Why, then, are so many economists (and indeed non-economists) seemingly allergic to the theory that the quantity of money is basic to the determination of national income? In this essay three possible sources of Wolf’s ‘visceral unwillingness’ are identified. The first is a suspicion of any mono-causal account of national income determination. Should so much attention be paid to only one macroeconomic variable? Critics of monetary analysis might say that the economy consists of thousands of goods and services, and that an economist might just as well talk about the equilibrium condition in the market for holidays, socks or potatoes as vital to the determination of national income.⁶ Why is there all this fuss about money?

The answer here begins by highlighting one of money’s distinctive features, its fixed nominal value. A note issued by the central bank is worth its stated value by law; a deposit in a bank is worth its nominal value because it is convertible at par into central bank notes. The nominal value of a note and the nominal value of money circulating inside the banking system do not change in the course of transactions. If the quantity of socks is doubled by an Act of God, and the number of feet is given, the nominal price of socks falls. If fewer package holidays are arranged because the *deus ex machina* of an airline pilots’ strike, and the number of days in July and August is

fixed, the nominal price of package holidays rises. But, if the quantity of money is halved or doubled by an Act of God (or indeed by the Prime Minister in cahoots with the Chancellor and the Governor of the Bank of England), and the quantity of goods is given, the nominal price of money does not rise or fall. It does not change, because – by its very definition – it cannot change.

The fixity of the price of money in nominal terms is essential in understanding why changes in the quantity of money *cause* changes in the price of non-money goods and services. A doubling of the quantity of money creates an ‘excess supply of money’ and violates equilibrium. Because equilibrium cannot be restored through a change in the nominal value of money, a rise in the prices of goods and services is necessary instead. A focus on money in discussions of economy-wide equilibrium is therefore justified by its distinctiveness as the system’s *numeraire*.

But that is just the start. Not only is money special in having a fixed nominal value, it also in modern circumstances has the property that its quantity can be heavily influenced by ‘the monetary authorities’ (i.e., the central bank and the government). It is – to some degree – ‘a policy variable’. Huge debates have arisen about whether bank deposits are under the direct control of the monetary authorities and whether the central bank should manage the quantity of its own liabilities (notes, the monetary base) or a rate of interest.⁷ There is no room here to pursue these debates, but the susceptibility of money to the influence of actions by the monetary authorities is not really in doubt. In short, money shares with non-money goods and services the characteristic that the quantity demanded (i.e., the quantity that agents wish to hold) is a function of income and price, but differs from them in that its nominal value is given and its quantity is subject to influence by policy-making bodies.

The widespread aversion to the mention of money may have a second source in the apparent ambiguity of the concept. According to a long-standing textbook convention, two groups of assets are amalgamated inside the single category of ‘money’. These are, first, money issued by the central bank and held outside the banking system (i.e., notes and coin in circulation with the public), and, secondly, the deposit liabilities of the commercial banks. But notes and deposits are not the same thing. The value of notes is fixed by the legal tender laws. In principle, deposits are convertible into notes at par, but – if banks go bust – full redemption may not be possible. Some economists have emphasized the distinction between the two forms of money and suggested that they be given different names, with notes being called ‘outside money’ and deposits ‘inside money’.⁸ Other have gone further and argued that macroeconomic analysis can be restricted to outside money.⁹ Eugene Fama at the University of Chicago has urged the conclusion ‘that a competitive banking sector is largely a passive participant in the determination of a general equilibrium, with no special control over prices or real activity’.¹⁰ In other words, analysts do not need to bother themselves with banks and broad money when they make macroeconomic prognoses.

Practicing central bankers are suspicious of Fama’s argument, since bank failures and declines in broad money have been conspicuous in periods of deflationary macroeconomic trauma (such as the Great Depression in the USA).¹¹ Nevertheless, Fama’s position has had great influence in monetary economics. When Minford asserted (as he did at a meeting of the Shadow Monetary Policy Committee in August 2007) that ‘the various money supply definitions form part of an industrial

equilibrium in the intermediary sector' and so need not figure in an assessment of the economic outlook, he is taking his cue from Fama.¹² In an earlier statement Minford was even more forthright, with the claim that 'though many deposits continue to be used in transactions through clearing systems, they cease to be money with a determinate demand, and become savings vehicles [like unit trust units] with an indeterminate demand'.¹³ Statements such as these provide background to the assertion that the ratio of broad money to income is 'all over the place'.

But Fama and Minford are wrong. Bank deposits and unit trust units are different assets with distinct characteristics, and banks are not at all like fund management groups. As a matter of routine unit trust units change in nominal value, whereas the nominal value of bank deposits does not. (The significance of this contrast should be evident from the earlier discussion.) Also basic is that bank deposits can be used to make transactions and are a medium of exchange, whereas unit trust units cannot generally be so used and are not a medium of exchange.¹⁴ The ability to give payment instructions against bank deposits enables their holders to reduce transactions costs. On the other hand, the expected rate of return on deposits is lower than that on unit trusts.

If bank deposits and unit trusts units were the only two financial assets, the equilibrium condition between them could be easily specified. It would be that money in the form of bank deposits is held in preference to unit trust units until the marginal expected reduction in transactions costs is equal to the marginal expected loss of return. Of course banks compete in order to provide the lowest bank charges and attract the most business. A key feature of the banks' own equilibrium condition is that the expected marginal cost of providing transactions services to depositors (i.e., investing in clearing infrastructure, employing staff to operate it and so on) be equal to the expected marginal revenue from the balance-sheet expansion due to deposit-taking (i.e., the excess of the interest received on assets over that paid on deposits).¹⁵ These are valid equilibrium conditions, in just the same way as those that specify the equivalence of the marginal utility of foreign holidays, socks and potatoes to their market price or the equivalence of the marginal cost of sock and potato production to their suppliers' marginal revenue. The demand function to describe the holding of bank deposits is just as 'determinate' as the demand function for holidays, socks and so on.

The third source of irritation with money may be the variety of functions that it serves and the resulting difficulties of analysis. Money is used in the *flow* of transactions in goods and services that constitute national expenditure in the current period, and forms part of the *stock* of assets that survives from period to period. The holding of money can therefore be rationalised in alternative ways, either as a 'transactions demand' or as an aspect of portfolio choice. Money held in portfolios is said to be for 'savings', in the sense that it contributes to the accumulation of financial assets. Asset accumulation and selection are often regarded as being at some distance from the determination of expenditure and income. So a common procedure is to include only notes and coin in circulation and sight deposits in 'money', because they are immediately available for transactions, and to exclude time deposits. By extension, 'transactions money' (or 'narrow money', which usually comes to much the same thing) is said to matter to the determination of aggregate demand, whereas 'savings money' (or 'broad money') does not.¹⁶ The effect is again to diminish the significance

of commercial banks in macroeconomic discussion, particularly in those economies (such as the USA today) where time deposits have become several times larger than sight deposits. Some economists even make statements about the relationship between narrow money on the one hand, and *both* national income *and* asset prices on the other. Implicitly, they see sight deposits as playing a major role in portfolio decisions, and time deposits as an unwelcome and irrelevant guest in the proceedings.

The mistake here is to talk about the economy as if in terms of a general equilibrium, with the intention that every relevant category (money, goods, assets) is embraced, and yet to eliminate one major type of asset (i.e., time deposits). In truth the monetary assets in an economy consist of notes and coin, sight deposits *and time deposits*, and there are equilibrium relationships between all of these and goods and assets. The nearest alternative to a sight deposit is plainly a time deposit, not a good or an asset. To eliminate such deposits by assumption is to omit a relevant and potentially very important variable.¹⁷ Indeed, since nowadays time deposits are considerably larger than sight deposits in many nations, remarks on the relationship between ‘money’, in the sense of narrow money alone, and asset prices are likely to be misleading.

A further argument against the restriction of money to notes, coin and sight deposits is more complex, but perhaps more fundamental. Its punch line is that the standard account of the monetary determination of national income works properly *only* with an all-inclusive measure of money. As is familiar, the standard account posits a stable desired ratio of money to income and an initial position of equilibrium. The equilibrium is then disturbed by a sudden increase in the quantity of money. Agents respond by a sequence of rounds of spending in which the excess supply of money is associated with excess demand for goods and causes a rise in prices until the original ratio of money to income is restored. The analysis turns on the premise that *individual* agents cannot change the *aggregate* quantity of money when they buy and sell goods and services. In Friedman’s words, in the hypothetical situation under discussion ‘if individuals as a whole were to try to reduce the number of dollars they held, they could not all do so, they would simply be playing a game of musical chairs’.¹⁸

But here is the rub. The premise of the invariance of aggregate money to individuals’ transactions does not hold for a less-than-fully-inclusive money aggregate. The explanation is simple, that when agents switch sums between the different forms of money (for example, from a sight deposit to a time deposit) – when in other words they conduct money-into-money transactions – they change *both* the size of their own narrow money holdings *and* the aggregate quantity of narrow money. By contrast, the invariance premise does hold for an all-inclusive measure of money, because by definition money-into-money transactions are impossible for such a measure.¹⁹

In short, a large body of theory argues that the desired ratio of money to income is likely to be stable. The ratio may change over the long run, because of developments in technology, tastes and institutions. But at any one time – with technology, tastes and institutions given – a clear implication of the stability of the desired ratio of money to income is that large increases or decreases in the quantity of money alter the equilibrium level of national income. The stability of the desired money/income ratio should apply for any measure of money (i.e., of cash, narrow money and broad money). Nevertheless, an all-inclusive measure of money was the traditional focus of economists’ analytical attention.²⁰ A strong argument can be made less-than-all-

inclusive money measures are unconvincing if put to work in the standard account of the monetary determination of national income. The shift in American monetary economics towards regarding the monetary base as the only valid and interesting measure of 'money', and the related belittling of the macroeconomic significance of the banking system, are dangerous intellectual trends and need to be resisted.²¹

The desired ratio of money to income: some facts

So theory argues that money's velocity ought not to move 'all over the place'. What about the facts? Detailed UK monetary statistics were first prepared officially in 1963, following a recommendation in the Radcliffe Report. What do they say about the ratio of money to income?

The key numbers are easily summarised. In the 43 years from the second quarter of 1963 to Q2 2006 the M4 measure of money rose by 98.5 times at a compound annual rate of 11.3 per cent, while national output (more precisely, 'gross value added at basic prices, in current price terms') climbed by 40.6 times at a compound annual rate of 9.0 per cent. Critics of the monetary approach might use these numbers to question claims of a stable money/income ratio. It cannot be gainsaid that the ratio of money to national output rose substantially, by almost 2 ½ times, in the 43 years. But the four decades in question saw immense institutional upheaval in the banking system, because of computerisation, internationalisation, the removal of restrictions on bank lending, the intensification of competition and other developments. Given the scale of these technological and regulatory changes in the background, an increase of only just above 2 per cent a year in the ratio of money to national output is modest. More pointedly, the changes in both money and national output are an order of magnitude larger (almost 100 times and 40 times) than the change in the ratio of money to output.

Another way of looking at the facts is to divide the 43-year period into sub-periods (of three decades and one sub-period of 13 years) and to see whether high growth rates of money and national output are associated. The exercise is carried out in Table 1.1. While the increase in money is not identical to that in nominal GDP in any decade and while indeed the difference between the growth rates of money and nominal GDP varies significantly over time, the link between trends in money and nominal GDP is clear. The decade to Q2 1983 saw the highest growth rates of money and nominal GDP, whereas the 13 years to Q2 2006 had the lowest growth rates of money and nominal GDP. Much more rigorous econometric tests have been conducted on many occasions and mostly confirm, if with a variety of technical qualifications, the validity of the relationship between money on the one hand and national income or output on the other.²²

Table 1.1 Growth of money and national output, 1963 - 2006 divided (roughly) by decade

Compound % annual growth rate in periods, according to Office for National Statistics website as at 1st August 2007.

		M4	GVA (i.e., national output)
Ten years to	Q2 1973	11.4	9.1
	Q2 1983	14.1	14.9
	Q2 1993	12.1	7.8
Thirteen years to	Q2 2006	8.4	5.9

Further insight is obtained by analysing the types of agent that were holding money over the 43-year period. Data are available in the UK, for all the 43 years at quarterly intervals, for the money holdings of

- 'the household sector' (predominantly individuals as such),
- non-financial corporations, and
- financial corporations other than banks.

Their respective money holdings at the start and end of the period are given in Table 1.2. A number of comments arise.

First, the household sector was the largest holder of money at both the start and the end of the period. The critics might emphasize that households' money increased almost 90 times in the period under consideration, whereas national output was up just over 40 times. But the nature of people's money holdings changed dramatically in the four decades from the early 1960s. Because credit cards had not been introduced, note holdings – which of course paid no interest – were much larger relative to deposits than nowadays. (In April 1963 the estimated circulation of currency with the public was £2,201m., while the deposit liabilities of the UK banking sector were under £11,000m. Many of these deposits were in company hands.) Further, non-interest-bearing current accounts at the English clearing banks (£4,339m. at 17th April 1963) were larger than interest-bearing deposit accounts (£2,725m. at the same date).²³ By contrast, at the start of the 21st century individuals' holdings of deposits are many times larger than their holdings of notes, while the majority of deposit holdings are interest-bearing. (At Q2 2006 households' currency holdings were £35.4b., compared with sterling bank deposits of £616.2b. At the end of June 2006 the M4 money measure included £689.3b. of interest-bearing retail deposits, but only £53.5b. of non-interest-bearing bank deposits.)²⁴ In short, whereas in the early 1960s non-interest-bearing money represented over two-thirds of all household money, nowadays such money is little more than 10 per cent of the household total. Because money has become a more attractive asset, it is – in equilibrium – larger relative to incomes and output than it was over 40 years ago. In fact, econometric analyses of the UK household sector's demand for money have routinely found it to be stable in recent decades.²⁵ Since individuals have been the most important single type of money holder since the early 1960s (and no doubt for much longer), this finding goes far to

refute claims about the instability of money demand and the alleged unreliability of the relationship between money and income.

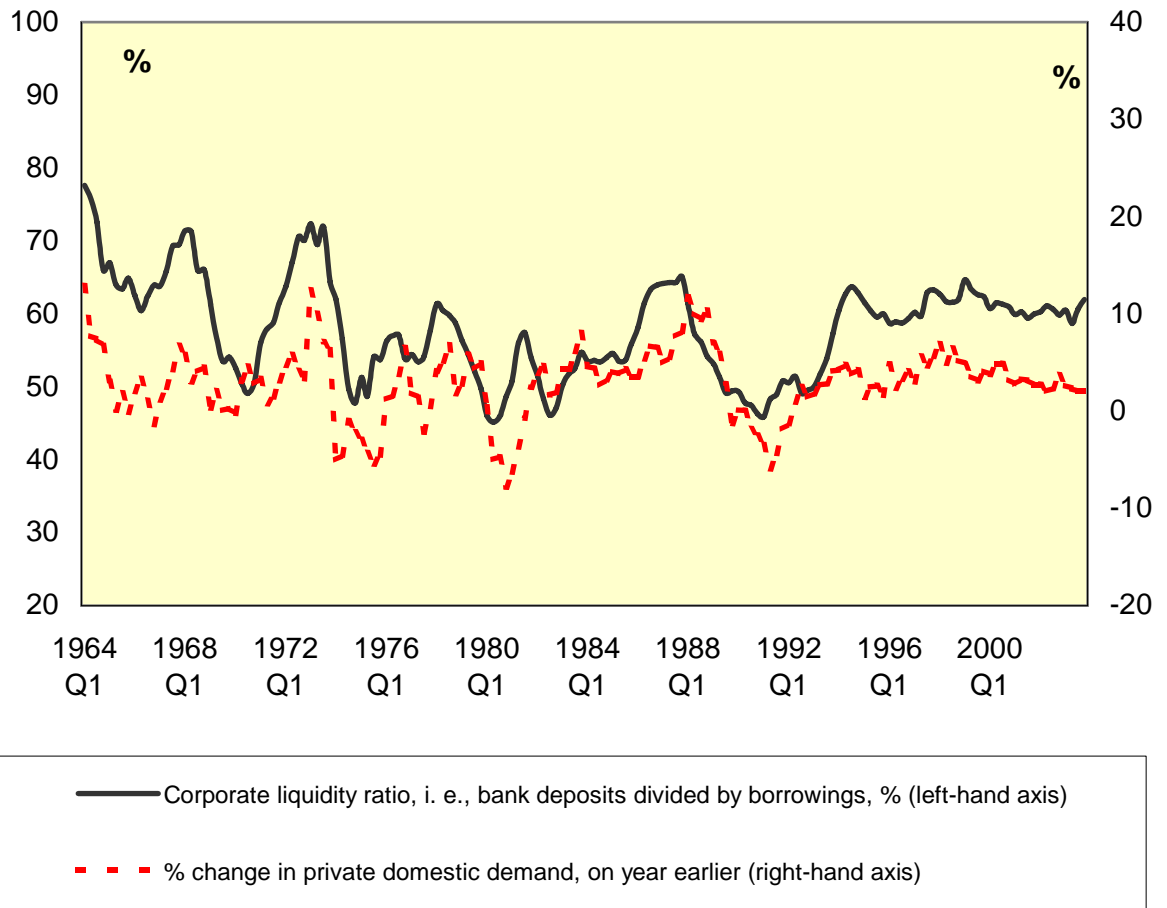
Table 1.2 Money holdings by type of agent, 1963 - 2006

Figures are of M4 holdings at end of quarter, in £m., seasonally adjusted, according to Office for National Statistics website at 1st August 2007.

	1963 Q2	2006 Q2	2006 as multiple of 1963
- Household sector	9,583	832,257	86.8
- Non-financial corporations	4,324	209,723	48.5
- Other financial institutions*	258	362,069	1403.4
- National output			40.6

Secondly, non-financial corporations' money has grown over the 43-year period at virtually the same rate as national output. (The compound annual growth rate of their M4 balances was 9.4 per cent, while that of national output was 9.0 per cent.) The similarity of the growth rates is striking, particularly as the non-financial corporate sector – then deemed a high-priority part of the economy by officialdom because of its role in producing and exporting – was the least subject to credit restrictions in the 1960s. It has therefore gained least from subsequent financial liberalisation and its money holdings have not grown much faster than output. In a separate statistical exercise the author has shown that the ratio of non-financial companies' bank borrowings to their deposits (or 'the corporate liquidity ratio') has changed remarkably little in the last four decades, while the corporate liquidity ratio has been correlated with the buoyancy of domestic demand.²⁶ (The relationship is depicted below in Chart 1.1.) This correlation may be interpreted as due to companies' actions in response to fluctuations in the adequacy of their money balances relative to a desired or 'equilibrium' level. As far as the UK corporate sector is concerned, the notion that money demand and velocity go 'all over the place' is untenable.

Chart 1.1: Corporate liquidity and domestic demand, 1964 - 2003



Thirdly, the suggestion might be made that the financial sector holds money to help in the timing of asset purchases and its activities have no direct bearing on national expenditure. (This is a mischievous suggestion, but let it stand for the moment.) If the financial sector is then excluded from the discussion, the result is to bring the growth rates of money and national output over the 43-year period much closer together. In mid-1963 and mid-2006 the combined money holdings of the household and non-financial corporate sectors were £13,907m. and £1,041,980m. respectively. The compound annual growth rate implied by these numbers is 10.6 per cent, compared with 11.3 per cent for total M4 and 9.0 per cent for national output. A gap between money and income growth remains, but it is not particularly large. Moreover, it can plausibly be attributed to the stimulus to the banks from liberalisation and intensifying competition. The banks reduced their margins and introduced more interest-bearing accounts, and as a result the equilibrium ratio of deposits to income increased substantially. Roughly speaking, for households and non-financial companies, the equilibrium ratio of money to income doubled in the 43 years from mid-1963 to mid-2006. A doubling was a big change, but – surely – it was overshadowed by the very much larger increases in money and income. Whereas ‘velocity’ in this sense altered

by a factor of about two, money in the hands of households and companies soared by a factor of 75 and national output by a factor of over 40. An emphasis on the instability of velocity seems misplaced, to say the least. If the annual growth rate of money had been significantly lower, by say 5 per cent, a fair conjecture is that the inflation rate would have been reduced by a similar figure.

Finally, quite unlike households and companies, the financial sector appears to be seriously misbehaved. Over the 43-year period under review financial institutions' money holdings exploded by more than 1,400 times. The compound annual growth rate of almost 20 per cent was markedly higher than that of national output, while the variation in the growth rate from year to year was much higher than for households and companies. The claim that velocity can change 'without limit' appears to have worthwhile supporting evidence in this part of the economy.

The analysis of financial institutions' demand to hold money is indeed difficult, but it would be wrong to say that their monetary behaviour is a pure will o' the wisp. As already noted, the financial sector's task is to manage assets rather than to oversee the production of goods and services. An essential point to reiterate is that the last four decades have seen major moves towards the liberalisation of financial markets and a narrowing of banks' loan margins. Organisations which simultaneously borrow from banks and hold money balances (and which are therefore particularly concerned that loan margins be as low as possible) have gained disproportionately from these developments. Typically these organisations, which include investment banks (labelled 'securities dealers' in the official data) and 'private banks' (i.e., companies that manage all the assets, and not just the bank deposits, of wealthy individuals and families), are in the financial sector. As such organisations have grown at a higher rate than national output, and as the UK has captured a significant share of rapidly-growing international financial services business in the last 40 years, the money balances of financial institutions have increased much faster than national output. This development has been understandable and is readily interpreted in economic terms. To some extent the impact of the boom in international financial services on UK money demand could be compared to shift in 'technology' or 'taste', which – as the earlier discussion recognised – could change the equilibrium ratio of money to income without affecting the validity of the underlying theory. If attention is focussed on institutions that have been active in the UK and relatively stable in structure over the whole of the last four decades, it turns out that money-holding behaviour is quite stable. For example, life insurance companies and pension funds have kept the ratio of their liquid assets (dominated by bank deposits) to their total assets consistently close to 4 per cent since the mid-1970s, even though their assets have climbed by more than 50 times since then.²⁷

While the analytical difficulties created by money held in the financial sector must be recognised, it is important to maintain a sense of perspective. The evidence seems to be that households, and to a lesser extent, non-financial companies keep their money holdings at all times fairly close to the 'equilibrium' levels suggested by the best-fitting money demand functions. As a result, when aggregate money growth fluctuates, the fluctuations in the money growth rates of the financial sector are amplified. When the annual growth rate of M4 as a whole rises from, say, 8 per cent to 12 per cent, the annual growth rate of financial sector increases from, say, 10 or 11 per cent to over 20 per cent. Conversely, when the annual growth rate of M4 falls

from 8 per cent to 4 per cent, the annual growth rate of financial sector money falls from 10 or 11 per cent to virtually nil. Some financial institutions – of whom life insurance companies and pension funds are good examples – try to keep their money holdings quite stable relative to their total assets. It is therefore not surprising that fluctuations in M4 growth, and the associated swings in financial sector money holdings, are accompanied by marked oscillations in asset prices (i.e., share prices, house prices and the values of commercial property).²⁸ These oscillations are undoubtedly relevant to the behaviour of demand, output and employment, and – at a further remove – to movements in the price level and the inflation rate.

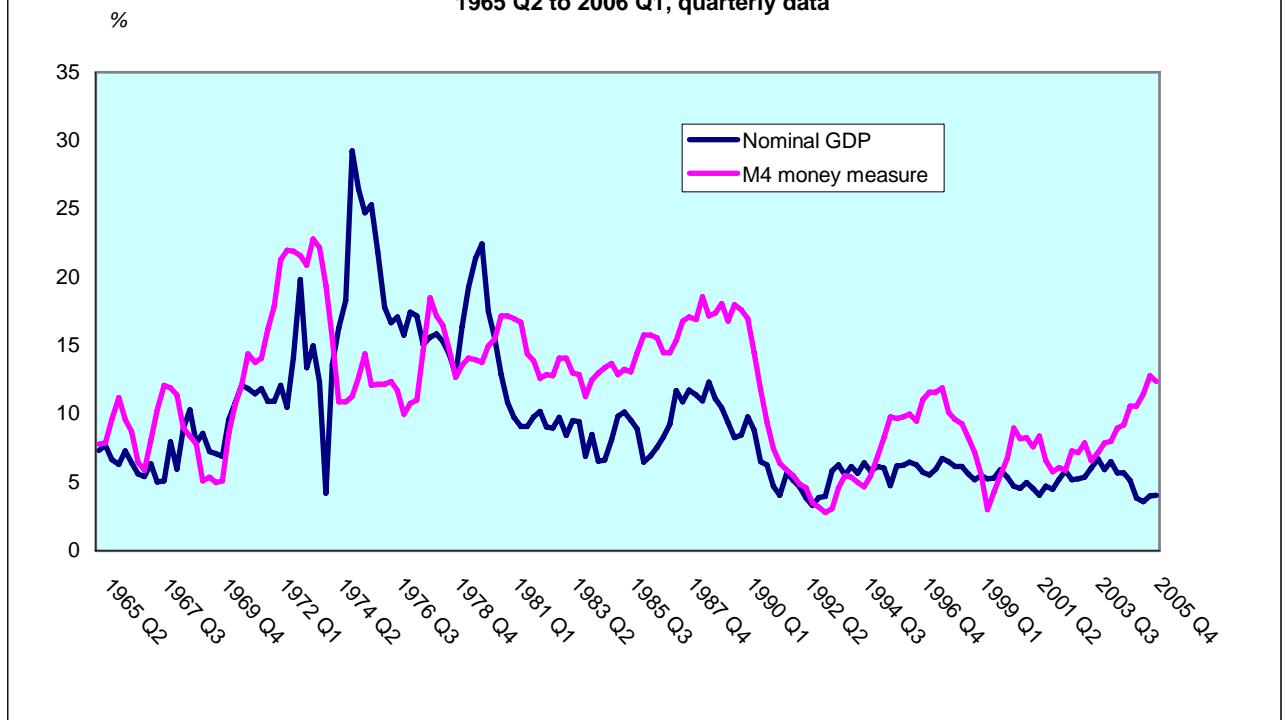
In summary, a sector-based analysis of money-holding behaviour yields valuable insights on top of those generated by the aggregate data. If particular sectors can be shown to have stable money-holding behaviour, that adds credibility to the claim that the combination of all the sectors – or, in other words, the private sector as a whole – should also have stable money-holding behaviour. A warning nevertheless needs to be inserted here about the notion of a money balance ‘belonging’ to a particular sector. While this notion is inescapable for analytical purposes and valid at any particular moment, it is invalid over the medium and long runs. Monetary data are a sequence of snapshots, but in the real world money balances are like the actors in a film and are constantly on the move. A particular ‘sum of money’ may be held by a financial institution on 1st January 2004, but by an industrial company on 23rd February 2005 (after the company has issued some shares and sold them to the financial institution) and a household on 18th October 2006 (after the company has paid some wages). People and companies are always seeking the right balance – the equilibrium value – of the money they hold relative to both their assets and their expenditure. Money therefore passes ceaselessly from agent to agent, and from sector to sector. Of course, this is one reason why the exclusion of financial sector money from the analysis is dangerous. A balance that was held by a life insurance company or a private equity fund at one date (when it is allegedly irrelevant to ‘spending in the shops’) may have circulated, after two or three rounds of transactions, to a balance in the hands of a household at another date (when the more stable money demand functions of the household sector argue that it is very relevant to expenditure).²⁹

Assessing the inflation risks

Claims that velocity moves ‘all over the place’ and that it is not subject to any upper limit have a definite statistical implication. This is that – if a series of values of the change in velocity is compiled – it will not conform to any known statistical distribution and will therefore resist a probability analysis. But, because of the availability of data in the UK since 1963, it is an easy matter to prepare such a series and to check whether it resembles one of the familiar statistical distributions.

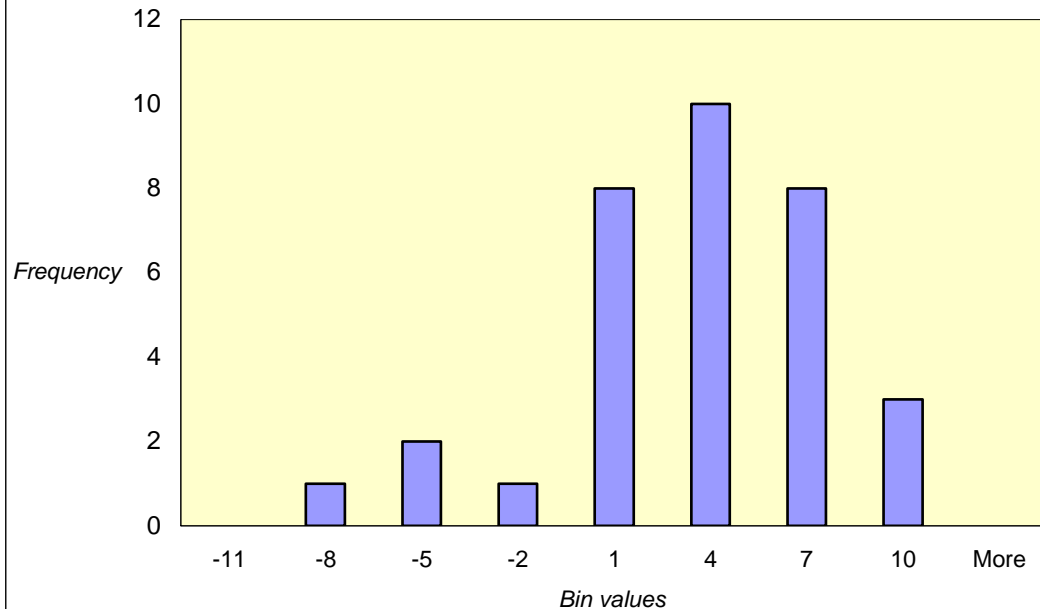
Chart 1.2: Money and nominal GDP, 1965 - 2001

Chart shows annual rates of changes in nominal GDP and M4 money, 1965 Q2 to 2006 Q1, quarterly data



The chart above gives the annual rates of increase in money and nominal GDP between 1965 and 2006, and a series for changes in velocity can be derived from the data underlying it. Visual inspection shows that the differences between the growth rates of money and nominal GDP were more pronounced after the early 1970s than before. As it happens, September 1971 saw a radical change in banking regulation, known as ‘Competition and Credit Control’, which liberalised bank credit and disturbed earlier relationships between money and macroeconomic data. The following analysis therefore relates to the period *after* the CCC reforms, as this is the period when some economists emphasized the ‘breakdown’ in demand-for-money functions and the supposed instability of velocity.³⁰ The period covered is in fact from the end of 1971 to the end of 2004, which contains 32 values for the change in velocity in the year to the fourth quarter (beginning with the annual change to Q4 1972). The histogram of these 32 values is shown below. The cut-off point of end-2004 has been chosen because it is the last full year before the current phase of double-digit annual rates of M4 growth.

Histogram 1: Histogram shows number of times the change in velocity fell within certain bins (value 1 to 4, 4 to 7, etc.) in the 1971 - 2004 period - *Histogram relates to annual data*



Whether the 32 values for the change in velocity constitute a recognised statistical distribution can be determined by a variety of tests, some of considerable complexity.³¹ However, in order to take the discussion forward, it is assumed that the 32 values conform to a normal distribution. (Again, visual inspection is sufficient to suggest that the assumption is not silly.) It is then a mechanical matter to estimate the probability that – *in any one year* – the change in velocity will fall between certain values. The mean value of the increase in the ratio of money to nominal GDP (i.e., the inverse of velocity) in the 32 years was almost exactly 2.0 per cent, with a standard deviation of 4.39. The probability that the increase in the ratio of money to GDP will lie between nil and 3.99 per cent (i.e., with values of the change in velocity that are 2 per cent either side of the mean) can then be calculated as over a third (34.8 per cent); the probability that the increase in the ratio of money to GDP will lie between 4.0 per cent and 5.99 per cent is 14.5 per cent; and the probability that the increase in the ratio of money to GDP will be more than 4 per cent above the 2.0 per cent mean (i.e., that it will be 6 per cent or more) is 18.1 per cent – or less than one in five. (The line showing probabilities of 6-per-cent-or-more increases in the ratio of money to GDP is highlighted in bold in the accompanying matrix.)

But the analysis can be taken further. Most economists who believe in the macroeconomic significance of money accept that the relationship between money and nominal GDP is rather imprecise in the short term and improves in the medium term. The greater reliability of the medium-term relationship can be assessed by taking two-year, three-year and so on moving averages of the change in velocity, and then conducting probability analyses with the resulting series of moving average values.³²

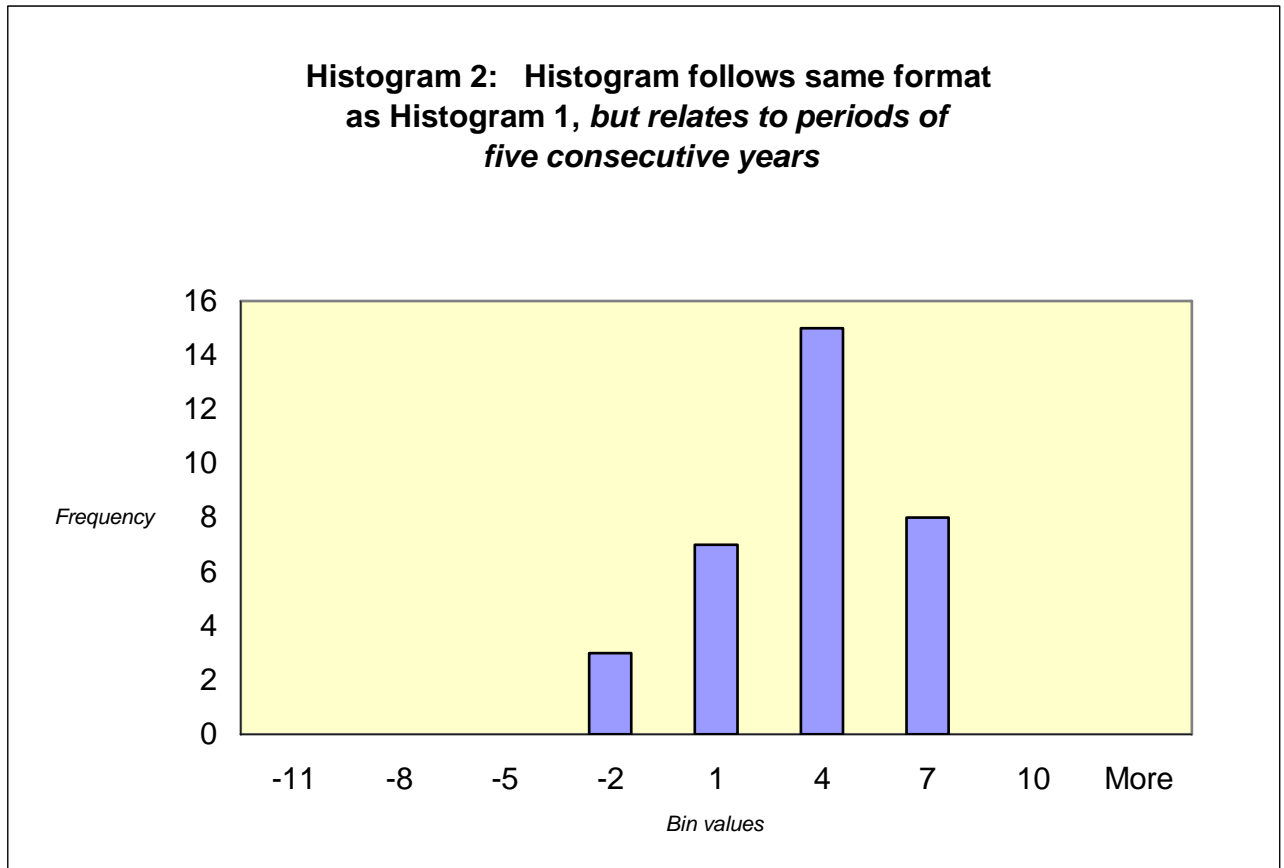
Table 1.3 Assessing probabilities of changes in the ratio of money to GDP

<i>Ratio increases by % per annum:</i>	<i>Length of time under consideration</i>				
	<i>In any one year</i>	<i>In periods of successive years:</i>			
	<i>one year</i>	<i>Two years</i>	<i>Three years</i>	<i>Four years</i>	<i>Five years</i>
Between 2.0% and 3.99%	17.4	21	22.9	25.8	26.9
Between 4.0% and 5.99%	14.5	14.5	15.8	15.8	15.3
Over 6.0%	18.1	14.5	11.3	8.4	6.2
Memorandum items:					
Mean value	2.01	2.01	1.99	1.95	1.9
Standard deviation	4.39	3.78	3.3	2.93	2.66

As would be expected, the standard deviation of the five-year moving average of the annual change in the ratio of money to GDP is appreciably lower than the standard deviation of the annual change itself. As a result, the probability of extreme outcomes is reduced. The likelihood that the ratio of money to GDP can rise by much more than 2 per cent a year (i.e., its average rate of rise over the period) within a particular period declines the longer the period under consideration. In fact, the probability that the ratio of money to GDP will rise by 6.0 per cent or more in five successive years is only 6.2 per cent, little better than 1-in-20. (See Histogram 2. As would be expected, this second histogram has fewer extreme values.)

In the two years to Q1 2007 the velocity of circulation of M4 fell by just over 6.4 per cent a year. The above analysis shows that this outcome is improbable. Assuming that the underlying relationships between money and income in the UK are much the same now as over the last three decades, the likelihood of two successive years in which the ratio of money to GDP rises by more than 6 per cent is only 14.5 per cent. To say that an outcome has a probability of less than one in six is not to preclude it. (Of course it has just happened!) The trouble is that the odds against sustained large falls in velocity become increasingly stretched the longer that rapid money growth persists. To repeat, the probability that the ratio of money to GDP will rise by 6 per cent or more in five successive years is little better than 1-in-20. In fact, the probability that the ratio of money to GDP will rise continuously by under 4 per cent a year over a five-year period (i.e., by under 22 per cent in the full five-year period) is roughly 72 per cent. Since the ratio of money to GDP has already increased by about 13 per cent since early 2005, it is very likely that the ratio of money to GDP will rise more slowly (perhaps by only 1 or 2 per cent a year) over the next three years. If M4 growth were 12 per cent in, say, the year from mid-2008, a 3 per cent rise in the ratio of money to

GDP would be consistent with a 9 per cent increase in nominal GDP. Since the trend annual growth rate of real output is not much more than 2 ½ per cent, that would imply an inflation rate of over 5 per cent. The official inflation target would be in ruins.



Conclusion: velocity is *not* ‘all over the place’

The UK evidence assembled in this paper argues strongly that – over the medium and long runs – changes in the ratio of money to income and expenditure (i.e., the inverse of velocity) have not been ‘all over the place’. Minford’s claim is contradicted by the facts. Since the UK’s money demand function is known to be badly behaved compared with other countries and therefore to be something of a ‘black sheep’ in international comparisons (perhaps because of the scale of its financial sector), the wider invalidity of the Minford claim is evident.³³

When an allowance is made for a variety of influences which may alter the equilibrium ratio of money to income, a change in the rate of broad money growth is accompanied by a very similar change in the *equilibrium* rate of increase in nominal GDP. It is true that several quarters of disequilibrium may elapse before the rate of increase in nominal GDP responds fully to the new higher or lower rate of increase of broad money. One purpose of the probability analysis carried out here has been to quantify the differences in the closeness of the relationship between changes in money

and nominal GDP growth rates for different periods of different length. To repeat a key conclusion, the UK data from 1971 to 2004 suggest that the likelihood of two consecutive years in which the ratio of money to GDP rises by more than 6 per cent is less than one-in-six, but that the likelihood of sustained large changes in the ratio of money to GDP declines the longer the period under consideration. Over five years the probability of consecutive annual rises in the money-to-GDP ratio of more than 6 per cent falls to little better than 1-in-20. Given the risks, policy-makers would be foolish to ignore the message of the monetary data.

There is a puzzle about the reception of monetary economics in UK policy-making (and indeed political) circles. The vital propositions are little more than amplifications of supply-and-demand analysis, and are clearly grounded in a large body of theory and evidence. Yet they remain controversial and continue to be resisted. Part of the trouble may be the widely-attested association between an interest in monetary economics and support for the free market, which upsets the high proportion of British economists with left-of-centre political tendencies.³⁴ Other possible explanations are a misguided over-commitment to the Keynesian income-expenditure model of national income determination (which in the naïve versions has no room for money) and an exaggeration of the problems of fitting money into general equilibrium models.³⁵ Fama's exclusion of the banking system (and so bank deposits and broad money) from an active role in the determination of national income illustrates how economists may slide from the identification of a curiosum in general equilibrium theory to the propagation of wholly mistaken views about how the real economy works. As Keynes once remarked, there is a danger in economics that – once a remorseless logician has started with an error – he or she may end up in bedlam.³⁶

This paper has relied on the traditional understanding of the relationship between money on the one hand and expenditure and inflation on the other, in which 'money' includes bank deposits. It has also been highly empirical. Attention has been paid to the facts about money, expenditure and velocity in the period, now somewhat longer than four decades, in which modern monetary and banking statistics have been compiled in the UK. Today's economists should be grateful to the Radcliffe Committee for recommending almost 50 years ago that better data be collected. Ironically, that data now demonstrates the invalidity of one of the committee's most widely-cited conclusions.

Notes

1. Committee on the Working of the Monetary System *Report* (London: HMSO, 1959), p. 133.
2. Arthur Seldon (ed.) *Not Unanimous* (London: Institute of Economic Affairs, 1960).
3. Patrick Minford 'Should central banks target anything other than inflation (such as money supply)?', contribution to *EMU Monitor* in the www.euointelligence.com website, 15th January 2007.
4. The first Liverpool Occasional Paper on 'Monetarism, inflation and economic policy' by Minford was published in early 1980 and based on his inaugural lecture, given at Liverpool University on 28th November 1979. The opening paragraphs referred to charts on inflation, budget deficits as a percentage of national income and the rate of growth of the money supply. According to Minford at that time, 'the strong associations between these three magnitudes is [sic] not coincidental' as 'there is a powerful body of economic theory predicting them'.
5. Numerous accounts of the processes at work are available in the literature, with one of the earliest and clearest statements being by Irving Fisher in his 1912 *Elementary Principles of*

Economics. (William J. Barber [ed.] *The Works of Irving Fisher*, vol. 5, *Elementary Principles of Economics* [London: Pickering & Chatto, 1997, originally published by Macmillan, New York, 1912].)

6. A common trick in the critique of general equilibrium results is to insist the equilibrium requirement for a trivial commodity (peanuts, potatoes) is as much a necessary condition of full equilibrium as the equivalence of the demand for and supply of money, bonds or whatever. The monetary equilibrium condition is then derided as of no particular significance. (Lerner used peanuts in a discussion of Hicks' *Value and Capital*. See Mervyn K. Lewis and Paul D. Mizen *Monetary Economics* [Oxford: Oxford University Press, 2000], p. 113. Patinkin mocked Friedman's observation about inflation being a 'monetary phenomenon' with the observation that 'by the same token one can say that the price of potatoes is a potato phenomenon'. See Don Patinkin 'Some observations on the inflationary process', in M. Flanders and A. Razin [eds.] *Developments in an Inflationary World* [New York: Academic Press, 1981].)
7. This is of course a reference to the famous debate about monetary base control, which harked back to the 19th century debate between the Banking and Currency Schools. According to Charles Goodhart, writing in 1995, 'the debate over monetary base control appears largely historical'. (Goodhart *The Central Bank and the Financial System* [London: Macmillan, 1995], p. 261.)
8. The distinction is usually attributed to John Gurley and Edward Shaw who made it in their book on *Money in a Theory of Finance* (Washington, D.C.: Brookings Institution, 1960). The 'which money?' debate goes back at least 150 years before Gurley and Shaw.
9. For a recent example of a paper in this tradition, see Ed Nelson 'Direct effects of base money on aggregate demand: some theory and evidence' *Journal of Monetary Economics*, vol. 49, 2002, pp. 687 – 708. The author of the current paper has strongly criticised the notion that base money (i.e., notes) can have any strong bearing on demand nowadays, with two facts being obtrusive. These are, first, that the value of transactions in notes are less than 1 per cent of the value of transactions passing through cheque and other bank clearing systems in the USA and the UK (and no doubt other industrial countries) and, secondly, a very high proportion of the note issue is held in the black, unrecorded economy, often outside the country of issue. See Tim Congdon 'Broad money vs. narrow money', no. 166 in the Special Paper series published by the London School of Economics' Financial Markets Group (London: 2006). The suggestion that notes form a meaningful element in wealth portfolios is also preposterous, partly because of their quantitative insignificance and partly because the very high costs of counting, bundling and transporting notes makes them impracticable in major legal capital transactions across the industrial world.
10. Eugene Fama 'Banking in the theory of finance' *Journal of Monetary Economics*, vol. 6, 1980, pp. 39 – 57. The quotation is from p. 47.
11. Ben Bernanke, the current chairman of the USA's Federal Reserve, explicitly rejected Fama's ideas in a 2005 interview. In his words, one lesson of the Great Depression was that 'the financial industry is a special industry in terms of its role in macroeconomic stability'. (Randall E. Parker *The Economics of the Great Depression* [Cheltenham, UK, and Northampton, USA: Edward Elgar Publishing, 2007], p. 66.
12. Minford 'Comment', p. 6, in *The Shadow Monetary Policy Committee: Quarterly Meeting and E-Mail Poll* (London: Lombard Street Research for the Institute of Economic Affairs), August 2007 issue.
13. Minford *The Supply Side Revolution in Britain* (Aldershot, UK, and Brookfield, USA: Edward Elgar Publishing, 1991), p. 71.
14. In a tradition initiated by Gurley and Shaw's *Money in a Theory of Finance* and a 1963 article by Tobin, no sharp operational distinction holds between banks and deposit-taking non-bank intermediaries, because deposit-taking non-bank intermediaries can – like banks – make payments on depositors' behalf. (John G. Gurley and Edward S. Shaw *Money in a Theory of Finance* [Washington, D.C.: Brookings Institution, 1960]), and James Tobin 'Commercial banks as creators of money', pp. 408 – 19, in Deane Carson [ed.] *Banking and Monetary Studies* [Homewood, Illinois, USA: Richard D. Irwin, 1963].) The claim has even been extended to certain types of investment organization, including 'non-bank mutual investment funds' (i.e., the US equivalent of unit trust groups), which have been said to provide 'transactions services'. (See 'Why do banks need a central bank?', pp. 3 – 18, in Charles Goodhart *The Central Bank and the Financial System* [Basingstoke and London: Macmillan, 1995]. The quotation is from p. 4.) Gurley and Shaw, and subsequently Tobin and Fama, went

on to propose that the distinction between banks and other financial institutions was *regulatory*, that banks were subject to cash reserve requirements whereas non-bank financial institutions were not. The mistake is to overlook that there are two types of specialist in clearing. A bank (or, at any rate, ‘a clearing bank’) holds deposits *in cash* (i.e., *legal-tender base money, mostly notes nowadays*) from non-banks. Its specific expertise enables it to repay deposits in notes and to make payments for depositors where settlement is also in cash (i.e., in an account at the central bank). A variety of other clearing specialists (securities exchanges, commodities exchanges) do *not* take deposits in legal-tender base money. Instead they include in their assets an account with a clearing bank, which is matched on the other side of the balance sheet with deposit liabilities to other agents who can be labelled for simplicity as ‘savers’. It is evident that the savers can make a multiplicity of payments to each other across this account, with each saver settling the difference between debits and credits by a change in his or her net claim on the clearing specialist. But the clearing specialist is *not* a bank and the savers do *not* expect it to repay their deposit with notes. Why – it might be asked – are savers prepared to have any claim on a clearing specialist of this sort, since they cannot immediately ‘get their money back’? The answer is that the clearing specialist can repay a saver’s deposit by transferring a sum in its balance with a bank (i.e., a clearing bank) to a bank balance held by a saver. The saver can then exchange the deposit for notes. Empirical substantiation of the distinction between banks as such and non-banks is easy. In a non-regulated environment genuine banks (i.e., to repeat, organizations involved in settlement *in legal-tender base money*) include among their assets both vault cash and a claim on the central bank. Other organizations do not hold significant amounts of vault cash or need to have an account with the central bank. (If they do have such an account, it is not to facilitate clearing business.) Pace Gurley, Shaw, Tobin, Fama and many others, genuine banks would hold vault cash and have a central bank account if there were no reserve requirements or ‘legal restrictions’ on their business whatsoever. Banks are operationally distinct from non-banks; they are not different purely because of regulation. The point – which is of fundamental importance in monetary economics – has been noticed before, but is widely misunderstood. (Jack M. Guttentag and Robert Lindsay ‘The uniqueness of commercial banks’ *Journal of Political Economy*, vol. 76, 1968, pp. 991 –1014.) None of the four economists mostly responsible for the mistake discussed here – Gurley, Shaw, Tobin and Fama – notice the distinction between clearing in cash and clearing across a bank account.

15. Both a clearing bank and a non-clearing ‘bank’ (such as an investment bank or a specialist housing finance institution) can lend money. But their supply functions are quite different. The non-clearing bank can expand its balance sheet only by borrowing, where ‘borrowing’ is the transfer of sums from other agents’ bank accounts to its bank account. An individual clearing bank could expand in this way, just like a non-clearing bank, if it held an account with another clearing bank. But in practice – for competitive reasons – clearing banks are averse to holding significant claims on each other. The individual clearing bank expands in two different ways. First, it can incur liabilities by attracting cash across the counter or (usually on a temporary basis) by borrowing cash from other clearing banks. Secondly, it can simultaneously add to assets (by extending a loan) and create deposit liabilities against itself ‘by a stroke of the pen’. The clearing banks’ ability to create money, apparently ‘out of thin air’, is limited by the adequacy of both its cash and its capital. But – since the system as a whole can borrow cash from the central bank – the ultimate constraint on money growth is imposed by banks’ capital. Further, the clearing banks could not create money unless they were involved in taking cash deposits. (In terms of the literature, only clearing banks possess ‘the widow’s cruse’. For a classic discussion, see the second chapter of John Maynard Keynes’ *Treatise on Money* on ‘Bank money’. [Donald Moggridge and Elizabeth Johnson (eds.) *The Collected Writings of John Maynard Keynes* (London and Basingstoke: Macmillan, 1971), vol. V, *A Treatise on Money: I The Pure Theory of Money*, pp. 20 – 29. *A Treatise on Money* was first published by Macmillan in 1930.] In Keynes’ words, ‘There can be no doubt that, in the most convenient use of language, all deposits are “created” by the bank’ on whose balance sheet they appear.) The remarks in this footnote are of considerable importance in understanding the contrasting fortunes of former building societies (Northern Rock, Alliance & Leicester, Bradford & Bingley) and the clearing banks in the liquidity crisis of September 2007.
16. For an example of an emphasis on the transactions role of money and a related view that only narrow money matters to macroeconomic outcomes, see Alan Walters *Britain’s Economic Renaissance* (New York and Oxford: Oxford University Press, 1986), p. 117 and p. 121.

17. In the first volume of his *A History of the Federal Reserve* (Chicago and London: University of Chicago Press, 2003), Allan Meltzer has an extended discussion (pp. 54 – 62) on the debates about defining money in the 19th and early 20th centuries, criticising the Banking School for its interest in credit and emphasis on the private sector's ability to create money substitutes. But he fails to spell out why he limits money to cash and 'checking deposits' or 'demand deposits', i.e., M1. (On p. 271 the stock of money is explicitly 'currency and demand deposits', although on p. 39 it is said that time deposits may sometimes be admitted.) It is easy to show that in the USA between 1920 and 1935 an index of the prices of common stock was correlated with time deposits, but not with the monetary base or M1. (See Tim Congdon *Money and Asset Prices in Boom and Bust* [London: Institute of Economic Affairs, 2005], pp. 89 – 95.) Meltzer's position in the 'which money?' debate is different from Friedman's. In his last published paper Friedman adopted M2, which includes time deposits, in a discussion of three large stock market cycles, and their macroeconomic sequels, in the 20th century. In his words, 'I have found M2 to be have a more reliable relation to other economic magnitudes than the other monetary aggregates.' (The quotation is from p. 146 of Milton Friedman 'A natural experiment in monetary policy covering three episodes of growth and decline in the economy and the stock market' *Journal of Economic Perspectives*, vol. 19, no. 4, 2005, pp. 145 – 50.) Edward Nelson discusses Friedman's changing allegiances on the money aggregates in Nelson 'Milton Friedman and US monetary history 1961 – 2006' *Federal Reserve Bank of St. Louis Review*, vol. 89, no. 3, 2007, pp. 153 – 82. For most of his career Friedman followed M2, but in 1982 he switched to M1. This led to a serious forecasting error and he reverted to M2 from 1986. Unfortunately, Friedman was sometimes less than accurate in remembering his own earlier positions on the subject. (See p. 164 of the Nelson article.)
18. See Milton Friedman 'Statement on monetary theory and policy, given in Congressional hearings in 1959, reprinted on pp. 136 – 45 of R. James Ball and Peter Boyle (eds.) *Inflation* (Harmondsworth: Penguin, 1959). The quotations are from p. 141.
19. The author first made this analytical point, which is basic to the emphasis on a broadly-defined, all-inclusive measure of money throughout his work, in stockbroker research papers in the late 1970s. He has made the argument that money-into-money transactions can nullify the causal role of a less-than-all-inclusive money aggregate on many occasions. For a relatively formal statement, see Tim Congdon 'Broad money vs. narrow money' *The Review of Policy Issues* (Sheffield: Sheffield Hallam University), vol. 1, no. 5, 1995, pp. 13 – 27. However, the point was clearly anticipated by Irving Fisher in 1912. If cheque payments are ignored, 'we may classify exchanges into three groups: the exchange of goods against goods, or barter; the exchange of money against money, or "changing" money; and the exchange of money against goods, or *purchase and sale*. Only the last-named species of exchange involves what we call the *circulation of money*.' (William J. Barber [ed.], *The Works of Irving Fisher*, vol. 5, *The Elementary Principles of Economics* [London: Pickering & Chatto, 1997, originally published in 1912], p. 151. Italics are in the original.) See also p. 178 of *Elementary Principles* on the same theme. The point is repeated on p. 34 of Fisher's 1914 *Why is the Dollar Shrinking?* (New York: Macmillan, 1914). The argument was also developed in John P. Judd and Bharat Trehan 'Velocity in the 1980s: an analysis of interactions between monetary components', no. 87 – 05, July 1987, in the Federal Reserve Bank of San Francisco's working paper series, accompanied by an expression of support for broadly-defined money in macroeconomic analysis.
20. Wicksell did not endorse a definition of money including all bank deposits, but his discussion of 'the cumulative process' in *Lectures on Political Economy* would be incomprehensible if it were not implicitly assumed throughout that the banking system's behaviour could affect the price level, and he explicitly rejected a quantity-theory approach in which money consisted only of metallic money (p. 154 and pp. 190 – 208 of vol. II, *Money*, of Knut Wicksell *Lecture on Political Economy* [London: George Routledge and Sons, 1935]); Fisher explicitly included bank deposits in his 'equation of exchange' and noted the effect of 'deposit money' on the price level (p. 179 and pp. 186 – 7 of Fisher *Elementary Principles of Economics*); Keynes' approval for broad money measures in a footnote on p. 267 of *The General Theory* was forthright ('As a rule, I shall, as in my *Treatise on Money*, assume that money is co-extensive with deposits. '); Robertson was relatively pragmatic, but clearly leaned towards an all-inclusive measure in the *Lectures on Economic Principles* published towards the end of his life ('I am in favour of casting [the net of definition] fairly widely...[F]or the kind of community in which we are most interested, we must included deposits with a bank drawable on by cheque...; and I doubt whether it is convenient to try...to draw line at "current

accounts” (UK) or “demand deposits” (USA).’ Dennis H. Robertson *Lectures on Economic Principles*, vol. III, *Money* [London: Staples Press, 1959, p. 13.]; Hawtrey’s early work was written before concepts of ‘money’ had stabilised, but he proposed a concept of ‘the unspent margin’ which ‘could be arrived at by adding up the liabilities of all the banks, or by adding up all the credits held by all their customers, whether depositors or note-holders’, and observed that it was the banks’ ‘action, not the [central bank] note issue, which directly affects the value of the monetary unit’ (p. 34 and p. 50 Ralph Hawtrey *Currency and Credit* [London: Longmans, 1923]); Friedman and Schwartz said in their *Monetary History* that ‘currency held by the public and sight *and time deposits*...in commercial banks’ (author’s italics) is ‘our concept of money’ (p. 630 of *A Monetary History of the United States, 1867 – 1960* (Princeton, New Jersey: Princeton University Press, 1963); and Johnson remarked that ‘in a modern economy’ money is ‘created by the banking system’ (p. 121 of Harry Johnson *Money, Trade and Economic Growth* [London: Allen & Unwin, 1962]). Numerous other references could be given for all these authors.

21. As already mentioned, Fama has been a seminal influence on the tendency to downplay – or even to dismiss – broad money and the banking system. But he is far from being the only prominent economist responsible for this intellectual development. Also important, for example, have been Patinkin and Lucas (and indeed the entire New Classical School in association with Lucas). In his 1961 article in the *American Economic Review* reviewing Gurley and Shaw’s *Money in a Theory of Finance*, Patinkin adopted their distinction between outside and inside money, and began his practice of claiming that increases in inside money did not entail an increase in society’s net wealth and therefore that the real balance effect related only to outside money. (Don Patinkin ‘Financial intermediaries and monetary theory’ *American Economic Review*, vol. LI, no. 1, 1961, pp. 95 – 116.) In Lucas’s theoretical papers money is issued by a consolidated state sector (i.e., by the government and central bank combined) and not by commercial banks. Bank deposits are therefore banished by assumption. (See, for example, Robert E. Lucas ‘Expectations and the neutrality of money’ *Journal of Economic Theory*, vol. 4, 1972, pp. 103 – 24, and particularly p. 229, with the statement that – apart from output and labour – his model contains only one more good, ‘fiat money issued by the government which has no other function’.) Typically in Lucas’s papers monetary equilibrium holds at all times. By implication, developments in money aggregates in the recent past have no message for future macroeconomic outcomes, because equality between the supply of and demand for money has already been attained. Events in the labour and goods markets instead become the causes of the business cycle. To the extent that money can matter, its influence arises because of the interplay between agents’ expectations and the monetary authorities’ attempts to influence those expectations. The expected growth rate of money is therefore more important than the growth rate of money recorded in the last few months and quarters. Because of the way Lucas’s models are set up, with only fiat money in existence and no banking system, it is only the expected growth of the base (i.e., M0 in UK parlance) that can be intended. Minford has clearly been influenced by Lucas’ work, just as he has been by Fama’s. In his paper on ‘Optimal monetary policy with endogenous contracts’ in Kent Matthews and Philip Booth (eds.) *Issues in Monetary Policy* (Chichester: John Wiley & Sons, 2006) he states in the first footnote ‘by money supply I mean here M0, the monetary base’ (p. 63) and his conclusion is that the money supply, in the sense of M0, ‘may well be the best operating instrument’ for monetary policy (p. 75). In this sort of world – which undoubtedly originates from New Classical Economics – agents’ expectations about the future behaviour of M0 are pivotal to macroeconomic outcomes. Is the world assumed in the theorising of Fama, Lucas, Minford and many others in the New Classical tradition realistic? In the author’s view it is not.
22. Luca Benati ‘UK monetary regimes and macroeconomic stylised facts’, *Bank of England Working Papers*, no. 290, 2006.
23. *Financial Statistics* (London: HMSO for the Central Statistical Office), December 1965 issue, p. 33 and p. 34, and *Financial Statistics*, December 1965 issue, p. 44.
24. *Financial Statistics* (London: Palgrave Macmillan for the Office of National Statistics), June 2007 issue, p. 224 and p. 59.
25. Ryland Thomas ‘The demand for M4: a sectoral analysis, Part I – The personal sector’ (London: Bank of England, Working Paper Series no. 61, 1997) and K. Alec Chrystal and L. Drake ‘Personal sector money demand in the UK’ *Oxford Economic Papers* (Oxford: Clarendon Press, 1997). A paper on the subject – Tim Congdon and Simon Ward ‘The

- personal sector's demand for M4 balances', *Lombard Street Research Econometric Research Note*, May 1993 – was discussed at a meeting of the UK's Money Study Group in 1993.
26. Tim Congdon 'The role of money in the British business cycle' *The Business Economist*, vol. 35, no. 3, 2004. A slightly amended and updated version of this paper appears as essay 15 on 'Some aspects of the transmission mechanism', pp. 316 – 29, in Tim Congdon *Keynes, the Keynesians and Monetarism* (Cheltenham: Edward Elgar Publishing, 2007).
 27. The behaviour of life offices' and pensions funds' cash ratio is discussed in the paper mentioned in footnote (26) above. It is also covered in pp. 32 – 40 of Tim Congdon *Money and Asset Prices in Boom and Bust* (London: Institute of Economic Affairs, 2005).
 28. This point is the central theme of Tim Congdon *Money and Asset Prices in Boom and Bust* (London: Institute of Economic Affairs, 2005). Numerous other papers with a similar argument have appeared. See, for example, Ramon Adalid and Carsten Detken 'Liquidity shocks and asset price boom/bust cycles', *ECB Working Paper Series*, no., 732, February 2007, and Annick Bruggeman 'Can excess liquidity signal an asset price boom?', *National Bank of Belgium Working Paper Research*, no. 117, August 2007.
 29. The August 2007 issue of the Bank of England's *Inflation Report* surveys the behaviour of the money holdings of different sectors on p. 14. It notes that much of the recent 'pickup in broad money growth reflects increased holdings by non-bank financial corporations'. It proceeds to remark, 'This sector is made up of a diverse range of businesses, which are likely to use their money holdings in different ways.' This may seem innocuous, but the writer may suffer from the misunderstanding that – when an agent 'uses' a money balance to purchase, say, an asset – the money disappears from the economy. Of course that is not so. The money reappears in the balance of the agent that sold the asset and it subsequently circulates an indefinitely large number of times. (As Wicksell, Fisher, Friedman and many others have explained over the decades, one individual's purchases of goods and assets may reduce his or her money balance, but they do not change aggregate money.) The mistake – which is very common – might be called 'the individual experiment illusion'. Bank of England publications also repeatedly make statement on the lines 'household money goes into consumption' and 'financial sector money is used to buy assets'. The statements again reflect a misunderstanding, this time about the permanence of a money balance's possession by a particular type of agent. Money is never 'used' or 'goes into' an economic end in a final sense. It instead circulates forever, passing between very different types of agent, some of them households, some of them companies and so on. Equilibrium – which has both stock and flow dimensions – is between the amount of money held and variables (income, assets, payments technology and so on) which similarly can be expected to survive for numerous periods to come.
 30. The 'breakdown' of the money demand function was pointed out by Michael Artis and Mervyn Lewis in a 1974 paper in *The Banker* and a 1976 paper in *The Manchester School*. See Artis and Lewis *Monetary Control in the United Kingdom* (Deddington: Philip Allan, 1981), passim, for further discussion. Numerous papers on similar lines followed those by Artis and Lewis.
 31. Two examples are the Kolmogorov-Smirnov and Shapiro-Wilk tests. The author – using a facility available on the Internet – carried out the KS test for the five-year moving average series of the change in the velocity of circulation. The verdict was that the test was 'not particularly happy' to call the distribution normal. (The results for the higher-frequency series would be worse.) Should that put one off? The author has no doubt that – with suitable massaging (increasing the number of observations, taking out the financial sector or whatever) – he could obtain a distribution which satisfied the KS and Shapiro-Wilk tests. Whether the economic interpretation would be enhanced is doubtful, although the matter is – of course – open to debate. Statisticians may notice that, in order to calculate a five-year moving average ending in Q4 1972 values are needed for the change in velocity in the years to Q4 1968, Q4 1969, Q4 1970 and Q4 1971. This feature – as well as the introduction of CCC – helps to justify the truncation of the period of analysis.
 32. As noted by Luca Benati in a recent Bank of England working paper, 'the high correlation between inflation and the rates of growth of both broad and narrow monetary aggregates at the very low frequencies' is 'a stylised fact' in the UK. (The phrase 'very low frequencies' refers to the calculation of rolling multi-year averages for the various series.) Benati's paper shows that the money/inflation relationship is 'remarkably invariant' to changes in policy regime (for example, from fixed to floating exchange rates). (See p. 32 of 'UK monetary regimes and macroeconomic stylised facts', *Bank of England Working Papers*, no. 290, 2006.)

33. The tendency for UK money/inflation relationships to be rather poor compared with money/inflation relationships in other countries is something of a puzzle and is long-standing. See the footnote on p. 514 of Peter Jonson 'Money, prices and output: an integrative essay', *Kredit und Kapital*, vol. 4, 1976, pp. 499 – 518. Statistical work by international organizations has generally found the UK's money demand functions to be less well-behaved than those of other countries.
34. The left-of-centre political orientation of most university economists has been established by a number of surveys. In the 1987 general election – when the Conservative Party had many more votes than Labour – only 17 per cent of academics supported the Conservatives. (David Willets *Modern Conservatism* [Harmondsworth: Penguin, 1992], p. 21, citing a MORI survey in *The Times Higher Education Supplement* of 5th June 1987.)
35. On the difficulties of accommodating money and assets in the Keynesian income-expenditure model, see Tim Congdon 'Why the 1981 Budget mattered: the end of naïve Keynesianism', pp. 19 – 53, in Philip Booth (ed.) *Were 364 Economists All Wrong?* (Institute of Economic Affairs: London, 2006). Frank Hahn has written several papers in which his identification of lacuna in theoretical monetary economics is extended to a wholesale critique of so-called 'monetarism'. See Hahn *Equilibrium and Macroeconomics* (Oxford: Basil Blackwell, 1984).
36. One purpose of this paper has been to show how Minford's approach to macroeconomic analysis and prognostication – in which the expected behaviour of M0 is of great importance – originates in papers by, among others, Patinkin, Fama and Lucas. These papers are very widely cited (as they have been here) and are generally regarded as classic contributions to the subject. It is very important to understand that these papers deny the relevance of events in the banking system to macroeconomic outcomes. Many people involved in business, investment and real-world policy-making – including the author – find this denial difficult to accept.