

# Interpreting movements in broad money

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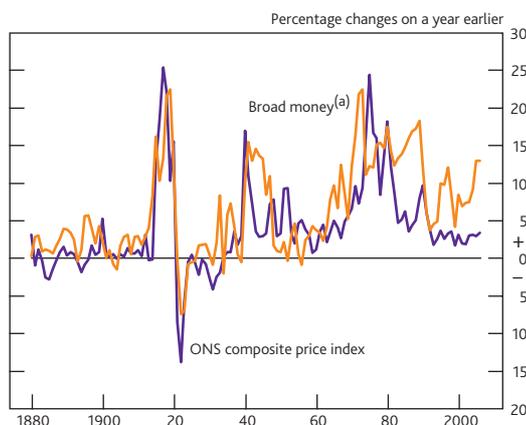
Understanding the role of money in the economy has always been an important issue for policymakers. And the pickup in broad money growth and decline in credit spreads over the past three years together with more recent financial market turbulence has made it a particularly pertinent issue. Monetary data can potentially provide important corroborative or incremental information about the outlook for inflation. But understanding the possible implications of money for the economic outlook requires a detailed assessment of the causes of money growth. Such an assessment must recognise the interactions between money and credit creation and the information contained in both price and quantity data. This article provides an overview of the potential channels through which money growth may affect inflation and the Bank's current empirical approach to analysing developments in monetary aggregates.

## Introduction

Money plays an important role in the economy. And as Friedman (1963) famously said: 'inflation is always and everywhere a monetary phenomenon'. The behaviour of money holdings by households and companies, therefore, should be of interest for monetary policy. This article builds on a long stream of work at the Bank on the role of money. Following on from papers such as Goodhart and Crockett (1970), Thomas (1996), King (2002) and Hauser and Brigden (2002), it provides an overview of the Bank's current framework for thinking about money, and highlights where innovative analysis is most needed. As such, the article represents a starting point for a larger programme of work on the causes of money and credit growth and their implications for the inflation outlook.

There is a well-established long-run empirical relationship between broad money growth and inflation across a variety of countries and monetary regimes (see for example Benati (2005) and King (2002)). In the short run, however, growth in the stock of broad money held by households and companies is affected by a number of factors, including financial innovation and portfolio shifts, that tend to make the relationship with inflation more variable (**Chart 1**). This makes interpreting movements in money growth more difficult over the horizons that are most relevant for monetary policy. Understanding why money growth has evolved as it has is key to assessing the implications for inflation.

Chart 1 Broad money growth and inflation



Sources: Bank of England, Capie and Webber (1995) and ONS.

(a) Based on M3 until 1963 and then M4.

In the second half of 2006, broad money growth rose to its highest level since 1990 and has remained high. Over the same period, interest rate spreads on household and corporate credit declined to unusually low levels. In recent months there has been considerable turbulence in financial markets — a process that is still under way. A key question is what developments in money and credit growth imply for the inflation outlook. The first section of this article looks at what money is and how it is created. The theoretical underpinnings of the relationship between money and inflation are discussed next, before considering an empirical approach to assessing the implications of monetary developments for inflation. The

final section concludes and sets out potential avenues for further investigation.

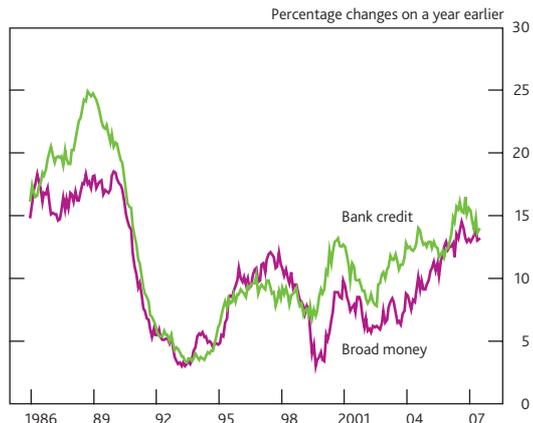
## What is money and how is it created?

At the outset, 'money' needs to be defined, and this is traditionally done through its principal function — a medium of exchange or means of payment. Money exists because of frictions and trading costs associated with conducting sequences of transactions at different times across a range of different markets. In particular, money eliminates the need to find individuals who wish to trade one particular good for another — known as the double coincidence of wants. Money also facilitates timely settlement of transactions, avoiding the need to extend credit to those about whom the seller may know very little.<sup>(1)</sup> The ultimate means of settling transactions is 'central bank money', either in the form of notes and coin or the balances held by banks at the central bank (reserves). That is generally referred to as narrow money. However, households and companies settle many transactions using their deposits with banks and building societies. These deposits are typically included in a wider definition known as broad money. The standard measure of broad money in the United Kingdom is M4. At the end of 2007 Q2, the stock of M4 was around £1.6 trillion, around 1.2 times annual nominal GDP. Notes and coin make up only around 3% of total M4.

The appropriate definition of broad money is by no means universal or constant. Differences across countries and over time largely reflect the structure of the financial system. For example, alternative assets may increasingly become 'money-like' as they are used for settling transactions, or some financial institutions outside the banking sector may begin to behave more like banks. Burgess and Janssen (2007), also in this *Quarterly Bulletin*, describe some recent difficulties in defining the appropriate boundaries for money in the United Kingdom.

Money is a key part of the transmission mechanism from monetary policy to economic activity and inflation. Monetary policy is typically implemented by setting the short-term interest rate, with the central bank allowing the supply of narrow money to expand or contract as required to meet the needs of households and companies at that rate.<sup>(2)</sup> But by far the largest role in creating broad money is played by the banking sector. Banks intermediate funds by taking deposits and lending part of that money to others. When banks make loans they create additional deposits for those that have borrowed the money. There is, therefore, a strong link between the growth of money and credit (**Chart 2**).<sup>(3)</sup> And the supply of broad money will depend on the behaviour of the banking system, as well as on official interest rates.

**Chart 2** Broad money and bank credit<sup>(a)</sup>



(a) Monthly data. Broad money is defined as M4, while bank credit is defined as M4 lending (excluding the effects of securitisations and loan transfers).

## Money and economic theory

### The traditional view of money and inflation

The cornerstone of the traditional theoretical relationship between money and inflation is the Quantity Theory of money. This is based on an identity known as the equation of exchange, which relates money to the transactions it is used to settle:

$$M \times V \equiv P \times T$$

where  $M$  denotes the money stock,  $V$  is the number of times the money stock circulates through the economy during a given period of time (the velocity of circulation),  $P$  is the price level and  $T$  is the number of transactions undertaken during that period.

In the long run it seems plausible that the number of transactions,  $T$ , in the economy will be determined by non-monetary factors (such as the quantity of labour and capital available for production and the structure of markets). Similarly, the rate at which money circulates through the economy,  $V$ , is likely to be determined by factors such as the efficiency and degree of development of the financial system. Under the assumption that these factors remain fixed, an increase in the money stock,  $M$ , would be expected to be associated with a proportionate increase in the price level,  $P$ , in the long run.

The difficulty with relying on this relationship in the short run, as highlighted in the 1980s, is that velocity is often volatile

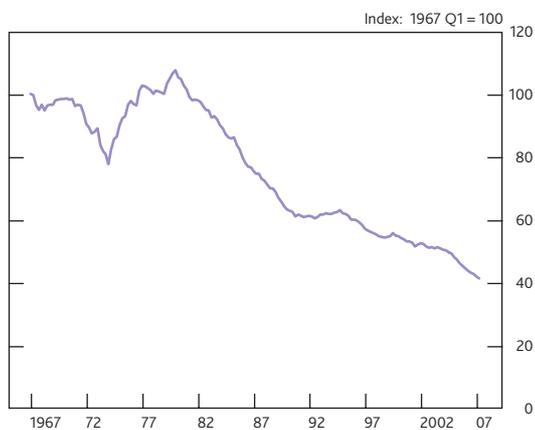
(1) See Kocherlakota (1998) for a formal treatment.

(2) An alternative way of implementing monetary policy is to control some definition of the supply of money such that the market-determined interest rate is in line with the desired monetary policy stance.

(3) The two are not identical because the banking sector also conducts transactions with institutions not covered by the money and credit data. For example, banks can fund their UK lending by borrowing overseas. And deposits held by the public sector are not included in the standard measures of money and credit so payments to and from that sector will affect the gap between M4 and M4 lending.

(Chart 3). Although velocity has generally declined over time, the speed of that decline has varied considerably. As a result, the empirical link between money growth and inflation has been less predictable over the past 30 years.

Chart 3 Velocity of circulation<sup>(a)</sup>



(a) Nominal GDP divided by the outstanding money stock (M4).

### Money demand and money supply

The equation of exchange says little about what determines the stock of money or indeed velocity. It only describes the relationship between those variables and a measure of the value of transactions in the economy such as nominal spending. But understanding the drivers of changes in the stock — or 'supply' — of money and changes in velocity — a proxy for factors affecting the 'demand' for money — is important. That is because the way in which different factors affect the interaction between the demand for money and its supply will determine the implications for nominal spending and, ultimately, inflation.

Monetary policy is a key driver of changes in the supply of money. When official interest rates fall, borrowing becomes more attractive, tending to induce higher bank lending and greater money creation. But that is not the only factor affecting the stock of money in the economy. In practice, the borrowing decisions of households and companies depend on the retail interest rates they face, rather than the policy rate. And there is a wide range of different products with interest rates set at various spreads to the policy rate. The quantity of bank lending, and hence broad money creation, will also depend on banks' lending criteria covering factors such as the creditworthiness of borrowers and loan to value ratios for secured borrowing. Changes in either spreads or lending criteria could therefore lead to changes in money growth without any change in the official interest rate.

Much of the demand for money stems from the need to fund transactions, as embodied in the equation of exchange. But money is also held as part of a portfolio of assets. So changes

in overall wealth can affect the demand for money if individuals wish to maintain the share of their assets held as money. In addition, changes in the relative attractiveness of money compared with other assets could alter the share of individuals' portfolios that they wish to hold as money. Changes in official interest rates can therefore affect the demand for money as well as money supply. Technological innovations that make it easier to use higher-yielding deposits in transactions, could also make holding those types of money more attractive.

According to standard economic theory, households and companies are likely to have a target level of money balances that they wish to hold — their demand for money. But they will often accept holding more or less than that amount in the short term as a (possibly very temporary) means of bridging the gap between payments and receipts. Over time they will attempt to return to their target level following a change in their money holdings. This is known generally as the buffer-stock theory of money demand.<sup>(1)</sup> Theory implies that the target level of money demand should be defined in terms of the real value of money balances, as that represents the purchasing power of money holdings. Given individuals' expectations about the current and future price level this then implies a target for the future path of nominal balances.

As noted earlier, changes in the money stock primarily reflect developments in bank lending as new deposits are created. Often, those who borrow will not want to keep the new deposits, but will instead use them to purchase goods and services or other assets. So the money passes to other individuals as the transactions are completed. These other individuals will also not want to hold the extra money balances for long unless their demand for money has changed. So over time they will spend the extra money, moving it on once again to a different set of individuals who face the same issue. To the extent that money balances are not used to repay loans, they cannot be eliminated, only moved around the economy. So an increase in money supply, other things being equal, leads to households and companies having temporary 'excess' money balances that they are prepared to hold in the short term as a buffer, but do not want to hold in the medium term. That leads to higher demand for goods and services or other assets that will eventually push up their prices.<sup>(2)</sup> As prices rise, the real value of money balances falls back, restoring the balance between money demand and money supply.

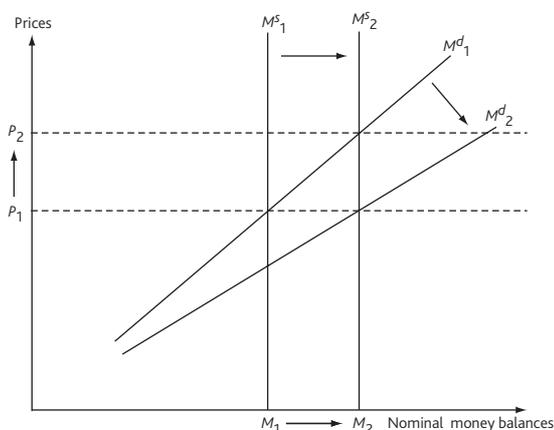
Figure 1 illustrates this process graphically. Initially, the money supply is assumed to be fixed at  $M^s_1$ , and  $M^d_1$  shows the demand for nominal money balances for a given level of real money balances. The demand curve slopes upwards

(1) See Laidler (1984) and Milbourne (1988) for a discussion of buffer-stock models.

(2) See Congdon (2007) for a discussion of this mechanism.

because a higher price level,  $P$ , requires a proportionate increase in the holdings of nominal money balances,  $M$  to achieve a given level of real money holdings. The slope of the money demand curve depends on the velocity of circulation as shown by the equation of exchange discussed earlier. Money demand and money supply are equal at the price level  $P_1$ . If the supply of money then increases to  $M^s_2$ , and money demand remains unchanged at  $M^d_1$ , the higher short-run level of real money balances will push up spending until prices are bid up to  $P_2$ , where money supply is again in line with money demand and real money balances are unchanged.

**Figure 1** Changes in money demand and money supply



By contrast, if the increase in the money stock is accompanied at the same time by an increase in money demand, individuals will want to hold some or all of the extra money balances rather than spend them. As a result, the rise in money supply will have less effect on the demand for goods and services or other assets and hence inflation. A shift in money supply to  $M^s_2$  met entirely by a shift in money demand to  $M^d_2$ , leaves prices unchanged at  $P_1$ .

So monetary policy clearly plays an important role in movements in money supply and money demand. And in many ways the transmission mechanism through to activity and inflation suggested above, can be described in an equivalent way using changes in official interest rates. But, importantly, the drivers of money supply and demand are not confined to the effects of changes in official interest rates. Developments in the banking sector and the financial sector more broadly also play a key role. So to the extent that these other monetary factors are likely to affect inflation, there could be incremental information in money growth over and above that contained in official interest rates.

It is also possible that there are other channels through which money specifically, rather than interest rates, can influence inflation. For example, some economists argue that temporary excess money balances can lead to additional changes in asset prices, which will affect nominal spending and

inflation through their impact on wealth. If assets are imperfect substitutes, individuals care about the composition of assets within their portfolio. As Tobin (1969) highlights, changes in money holdings would require the prices, and therefore returns, on other assets to adjust to induce them to want to hold that new level of money balances. That could be because the marginal value of additional money held for prudential reasons falls as more money is held (such that the risk of needing such large sums diminishes). The potentially imperfect substitutability of some types of asset is also a key part of the traditional monetarist view as set out, for example, in Meltzer (1995).

The influence of the banking sector on money and the imperfect substitutability of assets do not necessarily mean that policymakers need to focus on money growth. Looking at the full range of yields on other assets and banks' lending and deposit criteria could provide similar information. But money may be a useful summary statistic for this diverse set of data. And some yields, such as the liquidity benefits from holding certain assets, may be unobservable. Indeed, Friedman (1956) suggested that human wealth — the expected value of future earnings — might also influence the demand for money. Overall, this section has highlighted a number of ways in which monetary developments can go beyond the impact of changes in official interest rates. And that is particularly relevant in the context of modern macroeconomic models, which are discussed in the next section.

### The role of money in modern macroeconomic models

The current practice of central banks to implement monetary policy through changes in interest rates rather than changes in money supply has been reflected in modern macroeconomic models. In standard New Keynesian models, for example, aggregate demand is determined by expected real interest rates, with monetary policy characterised by an interest rate rule. There is no explicit role for money at all in such models.<sup>(1)</sup> This is also true for many of the larger models of this type used by central banks and others for forecasting purposes, including the Bank's quarterly model BEQM (see Harrison *et al* (2005)). Indeed, Woodford (2003) highlights that the relationships in New Keynesian models would hold even if the quantity of money in circulation became vanishingly small.<sup>(2)</sup>

Implicitly, these standard models assume that movements in interest rates adequately capture changes in other asset prices as well. That is the case if there are complete and flexible asset markets, such that the risk-adjusted returns on all assets are equalised. But the monetarist view suggests that this might not be the case, and so excluding money could be important

(1) See for example Clarida, Gali and Gertler (1999) and Rotemberg and Woodford (1997).

(2) However, the current framework for the implementation of monetary policy depends crucially on the banking system's demand for central bank money. See for example Clews (2005).

unless all yields are included in the model. By necessity, economic models are simplifications of the real world. And these additional monetary channels can sometimes be difficult to capture. So it could also be that standard models ignore these particular channels because their effects are small and do not significantly affect the model's performance.

Money can be added to standard models. But this is typically done in a way that makes it an additional output of the model rather than part of the transmission mechanism, for example through a 'cash in advance' constraint that forces money to be held to conduct transactions. Woodford (2007) shows that adding a money demand equation to a standard New Keynesian model in this way does not alter the paths of inflation, output and interest rates; it only provides extra detail about the outcome. So an active role for money is still missing. In addition, the standard macroeconomic models do not usually include a banking sector, a key part of the broad money creation process.

The exclusion of money from standard macroeconomic models raises two possibilities. It could be that money is indeed not needed or at least plays only a very small incremental role. It may contain only the same information about future inflation as other variables in the model, such as interest rates and output, and so have no incremental value. There is some empirical support for this. Studies such as McCallum (2001) and Ireland (2004) find only small effects from including money.

But it is also possible that the simplifications made by the standard models exclude important channels of the monetary transmission mechanism. Alternative models that attempt to capture some of the key features of money more explicitly generally fall into two groups: those that focus on the frictions and transaction costs that can influence the demand for money; and those that incorporate elements of the banking sector which can affect money supply. As noted above, two key frictions that generate a demand for money as a medium of exchange are the need to find buyers and sellers willing to trade (the double coincidence of wants), and the desire to avoid extending credit when little is known about other traders. These frictions are modelled, albeit in a stylised way, by Kiyotaki and Moore (2002) and Kiyotaki and Wright (1989). More recently, work has focused on integrating these features into broader macroeconomic models (see for example Aruoba and Chugh (2006)).

Frictions also affect the demand for money as a store of value. A key strand of this literature has looked at the extent to which transactions costs prevent some people from switching money into higher-yielding, but less liquid, assets such as bonds or equities. In these 'limited participation models', changes in technology that reduce transaction costs can affect money demand and therefore the prices of other assets.

Reynard (2004) finds that rising wealth in the United States has played a significant role in increasing participation in asset markets, and may help to explain changes in money demand.

Transaction costs in asset markets can also lead to different types of assets being imperfect substitutes. That would add to the value placed on liquid assets such as money. And as monetarist theories highlight, this can lead to changes in the quantity of money holdings affecting asset prices. Andres, Lopez-Salido and Nelson (2004) incorporate these features into an empirical model, and find that changes in money balances can have significant effects on asset prices.

A large part of the literature looking at how the banking sector may influence the supply of money is focused on the transmission of changes in monetary policy. For example, Bernanke, Gertler and Gilchrist (1999) develop a 'financial accelerator' model, where changes in interest rates can also affect the creditworthiness of potential borrowers, exacerbating the impact on bank lending and therefore the generation of deposits. Other papers, such as Markovic (2006), have looked at how the cyclical influence of monetary policy might also affect banks' own capital and hence their willingness to lend. But a second strand of the literature considers whether changes emanating from the banking sector itself may affect the supply of money. Gaspar and Kashyap (2006) introduce a spread between the policy rate and banks' lending rate into a standard New Keynesian model, with the implication that changes in the spread can affect spending and inflation. Goodfriend and McCallum (2007) model the banking sector more explicitly and find that changes in banking sector productivity can have substantial effects on spreads and therefore borrowing and spending decisions. Such models may prove to be useful tools for analysing the possible effects of recent financial market turbulence. Despite such advances, it is not straightforward to apply these findings in a policymaking context. In particular, most studies have focused on specific channels, and do not bring together money demand and money supply in a coherent way that can be incorporated in wider macroeconomic models.

### Money as an indicator

Even if money plays no incremental role in the transmission mechanism, it may still be a useful additional indicator. As noted earlier, it can be a useful summary statistic for the wide range of yields that must be taken into account in a world with imperfect asset markets, or the range of lending and deposit criteria that affect the role of the banking sector in the economy. Nelson (2003), for example, suggests that developments in monetary aggregates can be informative for this reason. Money can also provide an important cross-check for other indicators of inflationary pressures within the economy. For example, a key variable for judging medium-term inflationary pressure within the standard New

Keynesian model is the output gap — actual output relative to its sustainable level. But this gap can only be measured imperfectly. The sustainable level of output is not directly observable, and early estimates of actual output are subject to considerable uncertainty. So money growth may provide corroborative evidence to the extent its role as a medium of exchange means it is correlated with movements in activity.

Monetary data can be used, therefore, to complement the analysis of other economic data. They also have the advantage that they are typically published in a more timely manner. And estimates are not subject to sampling error as they are based on data from the entire population of banks. However, identifying the correct definition of the money stock can be difficult (see Burgess and Janssen (2007)). And as noted above, it is hard to judge the level of money growth that would be consistent with a given level of inflation, due to changes in money demand. For example, Coenen, Levin and Wieland (2005) find that, in recent years, the extent of changes in money demand in the euro area have meant that money has fairly limited information content as an indicator. And Dotsey and Hornstein (2003) find similar results for the United States. But this could simply highlight the need to understand better the drivers of money demand. Choi and Oh (2003) find that taking into account uncertainty over output and inflation can improve estimates of money demand in the United States. And that could make money more useful as an indicator.

## Money demand and money supply in practice

Whether money is useful purely as an additional corroborative indicator or as an incremental source of information, the key to the practical task of assessing the implications of developments in monetary aggregates for inflation is understanding why money growth has evolved as it has. Unanticipated events — 'shocks' — can occur for many different reasons. But ultimately the aim is to identify the extent to which different shocks have affected money demand and money supply. Changes in money growth must reflect changes in supply, but the key question, as illustrated in **Figure 1**, is whether that change to supply occurred in isolation, or whether it was accompanied by a change in the demand for money.

In practice, assessing how shocks affect money demand and money supply is difficult. And that has led to problems in the past in judging the appropriate policy response to monetary developments. The box in this article on page 382 highlights examples of substantial changes in both money demand and money supply in the 1980s. But difficulties in understanding the underlying drivers of the data are not unique to monetary aggregates. And they do not mean that money should simply be ignored. As King (2007) notes, the same issues arise when assessing developments in other economic variables, such as

output. Economists routinely try to assess whether movements in output reflect demand pressures or changes in the underlying capacity of the economy. In the same way, careful analysis is required of the likely causes of changes in money growth, in order to assess the potential risk posed to inflation by monetary developments. This point was also emphasised recently by Goodhart (2007). The next section sets out an initial step towards an analytical approach that can be employed to help form that judgement.

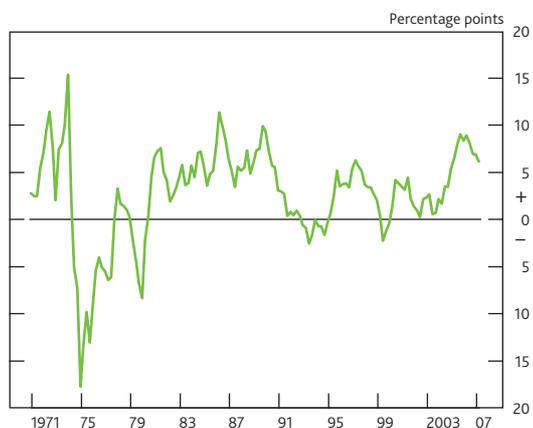
## Identifying the causes of money growth

When analysing monetary aggregates, the aim is to be able to build up a detailed picture of the likely impact of each potential factor affecting the growth in money. Overall growth can then be assessed to consider the extent to which changes in money supply have been accompanied by changes in money demand. In practice, estimates of the impact of different factors on money supply and demand are likely to be highly uncertain. And it is unlikely that money growth will be entirely 'explained' by the factors identified. But this process should at least provide a guide to the balance of risks. A range of information that can be used to identify potential factors affecting money growth is set out below.

### The standard determinants of money demand

As noted earlier, part of the growth in money is associated with rising demand for transactions balances as nominal spending increases over time. So one simple indicator of temporary 'excess' money balances is the extent to which money growth exceeds nominal spending (**Chart 4**).<sup>(1)</sup> However, as there are many other reasons why the demand for money may have changed, this indicator only really signals that further investigation is required.

**Chart 4** Annual money growth less nominal spending growth<sup>(a)</sup>



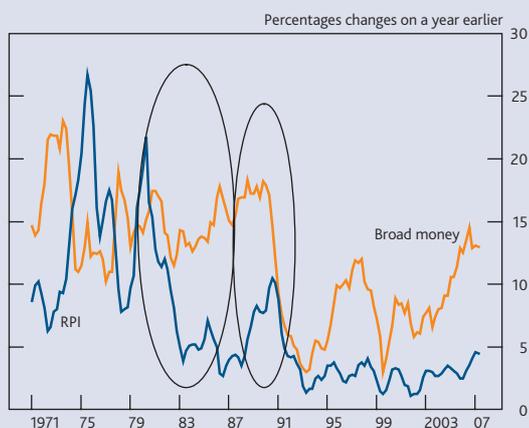
(a) Growth in M4 less growth in nominal GDP.

(1) Using the equation of exchange terminology, money growth in excess of nominal demand growth is equivalent to a falling velocity of circulation.

## Examples of money demand and money supply shocks in the 1980s

The 1980s provide a useful example of the difficulties of assessing the implications of strong money growth from the headline data alone. Annual growth in broad money remained high throughout the 1980s, averaging around 15%. But inflation followed a quite different path. It fell back rapidly in the early part of the decade before picking up sharply towards the end (**Chart A**). During that decade, there were substantial changes to both money supply and money demand. And as the balance between the different factors driving these changes evolved, the implications for inflation also changed.

**Chart A** Broad money growth and inflation



The impact on money demand of changes in spending, and other key determinants such as relative returns and wealth, can be estimated more formally through econometric equations. Such equations have often proved to be unstable in the past, reflecting the fact that they omit other influences on money demand.<sup>(1)</sup> These other factors are often difficult to capture in a single equation, either because they are a series of one-off events or are difficult to quantify. In spite of these difficulties, a simple mechanical approach, using standard determinants, can provide a useful starting point for estimating a measure of 'excess' money supply that might feed through to inflation. When estimated gaps arise, as they have in recent years, the key task is then to build up a more informative picture of other factors that may have influenced money demand or money supply through more detailed analysis.

### Information from the sectoral breakdown of money growth

The UK M4 data provide a breakdown of who holds deposits: households, private non-financial companies or non-bank (and

The 1980s were a period of substantial financial liberalisation and innovation. That boosted money growth through deregulation of the financial sector. Bank credit became easier to obtain, leading to more rapid creation of deposits. This was accompanied by innovations that made holding money balances more desirable. For example, current accounts began to pay interest and credit and debit cards made the use of interest-bearing deposits for settling transactions much easier. The move away from the very high and volatile inflation in the 1970s is also likely to have made holding money balances more attractive. In the early 1980s, money growth was high, but it did not feed through to nominal spending, and hence higher inflation, because households and companies wanted to hold more money balances.

In the mid-to-late 1980s, money growth was further boosted by monetary policy easing. This led to households and companies temporarily holding 'excess' money balances. In turn, that put upward pressure on the demand for goods and services and other assets which ultimately lead to higher inflation. But because rapid changes in money demand were still taking place, it was less clear at the time that strong money growth was signalling rising inflationary pressures.

A detailed analysis of the likely impact of financial market developments on money demand as well as money supply may have given a clearer picture of the risks to inflation. But the 1980s episode also highlights the importance of looking at other indicators in conjunction with money growth to assess inflationary pressures. For example, credit growth was even stronger than money growth in the late 1980s, with the annual rate peaking at almost 25% in 1988.

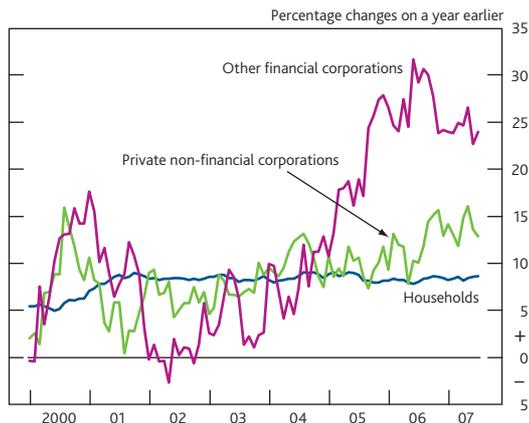
non-building society) financial companies (known as OFCs — other financial corporations). A similar breakdown is provided for bank lending. That can help to identify the potential causes of changes in money demand and supply by narrowing the focus onto a particular sector. But care is needed when using a sectoral approach. Changes in money supply may be generated by lending in one sector, but lead to temporary 'excess' money holdings in a different sector, as the additional money balances circulate around the economy.

In recent years, for example, much of the pickup in overall M4 growth has been driven by OFCs (**Chart 5**). OFCs' money growth tends to be much more volatile than other sectors, but the latest pickup has been sustained: deposits have risen by more than 85% over the past three years. This sector has become increasingly important over the past 25 years, with its share of overall deposits rising to around a quarter. In part, that reflects a growing share of households' assets being held

(1) For a discussion of the instability of estimated money demand equations and potential explanatory factors, see Ireland (1995).

indirectly through financial intermediaries such as pension funds. But the OFCs sector comprises a diverse range of businesses. And for some of the other companies within the sector, less is known about their motives for holding money. Improving the understanding of money growth in the OFCs sector is a key challenge for the Bank's current work on monetary analysis (see Burgess and Janssen (2007) for a discussion of some key issues relating to OFCs' deposits).

**Chart 5** Broad money holdings by sector



Temporary holdings of excess money balances in different sectors are likely to have different implications for activity and inflation. An overhang of money in the household sector might lead to higher consumption, while an overhang in non-financial companies might lead to increased investment spending. Excess money holdings by OFCs are perhaps more likely to feed through to asset prices, as those companies attempt to rebalance their asset portfolios. Disaggregated money data can be useful, therefore, as an indicator of specific components of spending (see Hauser and Brigden (2002) and Thomas (1997a, b) for more detail), as well as highlighting where corroborative evidence of a money overhang might arise.

### Understanding developments in the banking sector and financial markets

Innovations in the financial sector are another key source of changes in money growth. For example, the box in this article on page 382 highlights the impact of financial liberalisation in the early 1980s on both money supply and money demand. That reflects the fact that the banking sector plays such an important role in the creation of money. Changes in the terms for deposits will affect the demand for money, while changes in the terms for loans will affect the amount of bank lending and hence money supply.

There are a number of different sources of information that can be used to identify and evaluate changes in banking sector behaviour that may have affected money growth. For example, data are collected on the retail interest rates faced by

households and companies. And time-series data are available on some bank lending criteria, such as loan to value and loan to income ratios. Changes in lending terms and conditions can also reflect innovations in the structure of banks' balance sheets which can be monitored. Indeed, in some circumstances credit rationing may occur, in which case data on the size and composition of banks' balance sheets may contain more information than quoted interest rates.

But other changes may be less apparent in standard statistical series. In such cases, market intelligence can often provide an important additional source of information. The Bank maintains a dialogue with participants in the banking sector and the financial markets more generally through a variety of channels. These range from the new Credit Conditions Survey (see the article by Driver (2007) in this edition of the *Quarterly Bulletin* for more details) to reports from the financial market contacts of the Bank's regional Agents and other, less formal, regular working level discussions. The importance of developments in the banking sector and financial markets for interpreting movements in money growth is highlighted in the discussion below of recent trends in money growth.

### Judging the implications of money shocks

Once the candidate drivers of money demand and money supply have been identified, the next step is to understand how they might, on balance, feed through to inflation. That can be difficult because the impact on the transmission mechanism of the interaction between such a potentially wide range of factors is not well specified in the theoretical literature. This is an area where further research may prove useful. But the lack of good models should not lead policymakers to ignore the shocks. Instead, as is often the case with other economic developments, judgement must be exercised. That will involve generating a pragmatic assessment of the risks posed by the various monetary shocks. In that way, policymakers can then decide on the appropriate policy response. As part of that process, it is also important that the potential implications of developments in money for other variables, such as asset prices, are taken into account, to avoid double counting the news contained in those indicators.

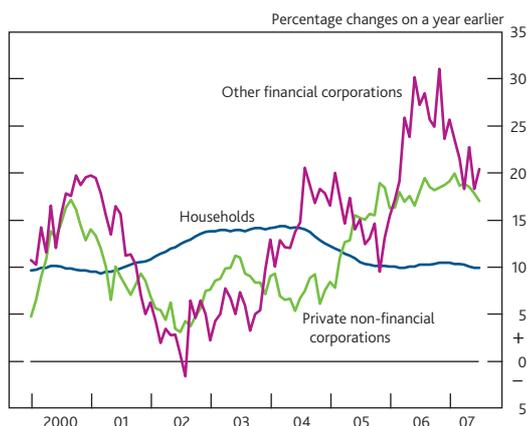
### Interpreting recent movements in broad money

In practice, policymakers consider a range of evidence on the potential drivers of monetary data. The pickup in money growth, declining credit spreads over recent years and the incipient tightening of credit conditions associated with the financial market turbulence over recent months, provide useful examples. The rapid money growth and declining credit spreads over the past few years are discussed first before

turning to the developments associated with the more recent financial market turbulence.

As noted earlier, much of the pickup in broad money growth over the past three years can be accounted for by OFCs. In large part that has been generated by increases in the growth of bank lending to that sector. But there has also been a pickup in the growth of lending to private non-financial corporations (PNFCs) (Chart 6).

Chart 6 M4 lending by sector<sup>(a)</sup>

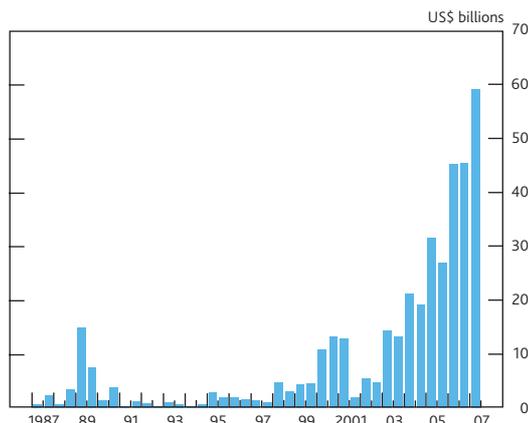


(a) Excludes the effects of securitisations and loan transfers.

In part, these movements are likely to reflect changes in the structure of financial markets. Burgess and Janssen (2007) highlight two substantial changes. First, the expansion of OFCs intermediating between banks is likely to have boosted both money and credit growth in that sector. And second, the rapid growth in securitisations of loans could have led to increases in both aggregate money and credit (though this depends on how the deals were structured and on the behaviour of the aggregate banking system in response). Tucker (2007) notes that securities dealers may also have expanded their borrowing and deposits through greater repo activity with banks. Much of this may net out for the dealer concerned, but will still appear on both sides of banks' balance sheets, boosting money and credit growth. Such transactions between the bank and OFCs sectors are unlikely to have any direct implications for inflation — additional deposits are willingly held so the increase in money supply has been associated with an equivalent increase in money demand.

Other changes could affect asset prices. For example, the rapid growth in debt-financed merger and acquisition activity led to sharp increases in lending to companies (Chart 7). The deposits generated by such lending may be held by the acquiring companies temporarily, but will ultimately be used to buy other assets which may be associated with higher asset prices. The extent to which asset prices have already adjusted in anticipation of such activity is unclear.

Chart 7 LBO loan issuance<sup>(a)</sup>

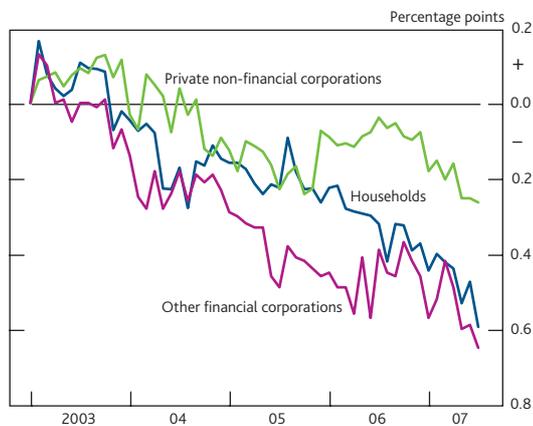


Source: Dealogic.

(a) Leveraged buyout loans taken out by UK companies. Half-yearly data as at 6 September.

These changes are unlikely to explain all of the pickup in money growth over the past three years. Another contributory factor could have been a loosening of credit conditions by the banking sector over the same period. Spreads on bank lending to both households and companies narrowed between 2004 and mid-2007 (Chart 8). To the extent that this was not offset by increases in other price components of lending, such as fees, it is likely to have increased bank lending, generating stronger money growth. Further, the proportion of new mortgages taken out at higher loan to value and loan to income ratios increased during that period (Chart 9), suggesting that banks may have loosened their non-price criteria for household secured lending. That is consistent with evidence from banks, which also indicated an easing of non-price terms on corporate borrowing in recent years. These developments are likely to have boosted the supply of money.

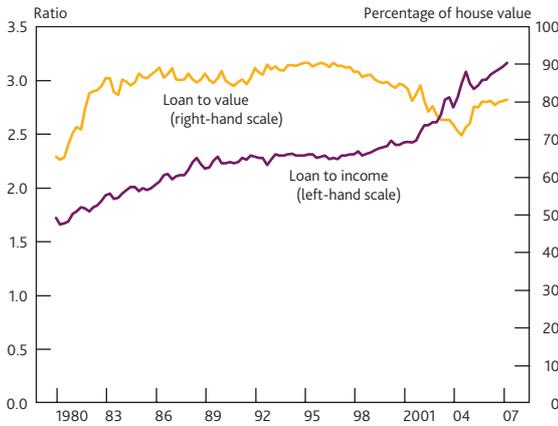
Chart 8 Changes in bank lending spreads between January 2003 and July 2007<sup>(a)</sup>



Sources: Bank of England and Bloomberg.

(a) Effective retail interest rates on the stock of outstanding loans relative to an appropriate funding rate. For floating-rate products, that is assumed to be Bank Rate. For fixed-rate products, Libor and swap rates of similar maturities are used (averaged over the relevant horizon and lagged one month). Prior to 2004, the shares of each product within the total borrowing for each sector are held constant due to lack of data.

**Chart 9** Median loan to value and loan to income ratios on new mortgages<sup>(a)</sup>



Source: CML/BankSearch Regulated Mortgage Survey.

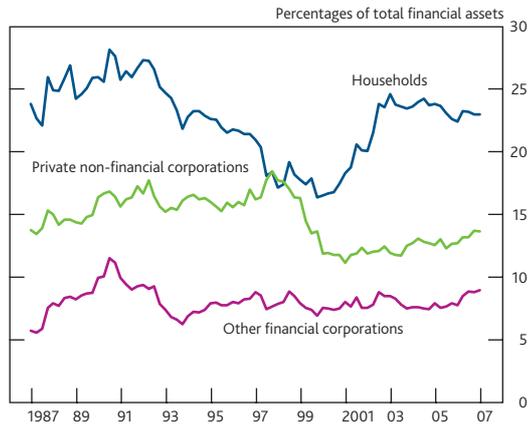
(a) New loans for house purchases by both first-time buyers and home movers. Changes to the methodology and sample of the survey in 1992 Q2 and April 2005 mean that the figures before and after those dates are not strictly comparable.

The loosening in credit conditions between 2004 and mid-2007 could have partly reflected an increase in banks' ability to intermediate funds. For example, the expansion of the securitisation market allowed banks to obtain funding for their lending at lower interest rate spreads relative to the policy rate. And to the extent that banks used securitisations to shift credit risk off their balance sheets, they may have been able to expand their lending more rapidly for a given capital base. Gieve (2007) also highlights the potential role of developments in information technology and derivatives markets that may have allowed banks to manage their risk exposures more effectively. Another possible explanation for the loosening in credit conditions may have been greater competition within the banking sector.

The implications for activity and inflation of this possible boost to credit and the money supply in the past few years will depend, as noted above, on whether there was an associated increase in the demand for money. Money demand may have increased to some extent. Over the past three years, deposit rates for OFCs have increased relative to Bank Rate, increasing their attractiveness. That could have been a counterpart to the expansion of credit, if banks were trying to attract deposits as a way of funding their lending. However, over this period spreads on deposit rates for private non-financial companies have been broadly stable while household deposit rates have fallen relative to an appropriate set of market interest rates. Another possibility is that rising wealth could have boosted the demand for money by households and companies, as they sought to maintain the share of their overall asset portfolios held as money. Despite the rapid growth in money holdings, the proportion of financial asset portfolios accounted for by money has remained broadly constant since 2004 (Chart 10). However, the key issue is what caused wealth to increase over this period. The increase in wealth may have been the result of the credit supply shock as the faster creation of money

balances boosted the prices of other assets. The extent to which the demand for money increased independently of the credit supply shock, therefore, is unclear. And at least part of the past increase in money growth may have reflected an increase in supply alone, which could ultimately feed through into inflation.

**Chart 10** Broad money as a share of financial assets<sup>(a)</sup>



(a) Non seasonally adjusted quarterly data.

So developments in the banking sector and financial markets appear to have affected both money demand and money supply in recent years. But quantifying the scale of the different factors, and hence any potential overhang of temporary excess money balances, is difficult. Further development of the analysis set out above, using a wide range of quantitative and qualitative information, may help to provide more robust estimates. In addition, other economic indicators can be used as a cross-check on the potential effects of strong money growth. For example, the recovery in business investment during 2006 is consistent with the pickup in corporate borrowing.

Some of the factors discussed above reflect structural changes in the financial sector that are likely to persist. But it is possible that at least part of the developments in the monetary data over the past few years was cyclical. Indeed, a key judgement for policymakers is the likely persistence of such effects. The turbulence in financial markets in recent months and the likely associated tightening of credit conditions suggests that market participants may be re-evaluating the riskiness of lending portfolios. This could ultimately lead to a slowdown in bank lending and potentially lower spending and inflation. While the extent to which credit conditions might tighten is highly uncertain at this stage, this episode highlights the important role of monetary data in assessing the situation. In exceptional times, substantial liquidity and risk premia may affect financial market prices so that quantity information — on both broad money and credit — can be particularly useful for analysing the behaviour of the financial sector. Continued monitoring of developments in

money and credit in the coming months will help to shed light on recent events.

## Conclusions and future work

Standard macroeconomic models are largely silent on the role of money in the economy. And empirical relationships between money and inflation have tended to be unreliable over short horizons. But that does not necessarily mean that developments in monetary aggregates are irrelevant. At the very least they provide a cross-check for other economic indicators that are subject to uncertainty. And there may also be channels through which monetary quantities contain incremental information for inflation.

Broad money growth has picked up sharply over the past three years. Understanding why that has happened is crucial in assessing the possible implications for inflation. Looking at the potential factors in more detail, a number of these appeared to boost money supply and, to some extent, money demand. While money growth associated with changes in money demand is likely to have few implications for inflation, changes in supply that generate an overhang of temporary 'excess' money balances could lead to higher demand for goods and services and other assets, pushing up inflation. Over recent months, credit conditions are likely to have tightened in light of global financial market turbulence. It is too early to judge if these effects will persist, which could lead to a slowdown in bank lending and potentially lower spending and inflation.

And assessing these very recent developments is certainly not an easy task. But to put the recent events in context requires an analysis of the developments in broad money and credit over the past few years. And judging their likely impact on inflation going forward requires continued monitoring of money and credit data.

The basic approach set out in this article provides a starting point for thinking about movements in broad money. And it has underpinned the analysis of recent monetary developments in the Bank, as discussed in recent *Inflation Reports* and the minutes of recent meetings of the Monetary Policy Committee. But further development of this analysis is required. Three main areas of work are planned. First, innovations in the banking sector raise measurement issues regarding the appropriate definition of money. The article by Burgess and Janssen (2007) in this *Quarterly Bulletin* is a first step in setting out the issues in this area. Second, the rapid pace of technological change in the financial sector means that it is important to utilise market intelligence to understand the implications of these changes. The Bank is continuing to develop its market intelligence function, and the new Credit Conditions Survey (outlined in the article by Driver (2007) in this edition of the *Quarterly Bulletin*) is an important element of this process. Finally, further work on modelling the role of money in the economy may allow the insights from monetary aggregates to be captured more formally.

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