A Note on Monetary Policy

John Whittaker

In the UK and other countries with developed financial markets, central banks set the short-term nominal interest rate for the currency that they issue: the short-term interest rate is the monetary *instrument***.**

The first part of this note describes how the central bank interacts with financial markets and how its choices of interest rate are transmitted to the wider economy. The second part is about how the central bank makes its choices of interest rate.

1. What is monetary policy?

2. How does the central bank choose the interest rate?

Lancaster University
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www.lancs.ac.uk/staff/whittaj1/

1. What is monetary policy?

1.1 The functions of banks

The main business of commercial banks is to take deposits and to lend, and they make profits from the interest margin between the rate they charge for loans and the rate they pay to depositors. The other important function of banks is to operate the payments system. For this purpose, about half of private sector deposits in UK banks are *sight deposits* that may be withdrawn without notice when the account holder makes a payment (see the simplified balance sheet below). But loans are the largest component of banks' assets and they are *illiquid*: they represent the working capital of firms or mortgage finance to householders, for instance, and cannot easily be 'called-in' or sold if the bank needs to pay its depositors.[1]

To cope with net withdrawals of deposits, banks therefore need *liquid assets*, the most liquid being holdings of currency (banknotes) and *reserves*. Reserves are the banks' own deposits at the central bank (hence they also appear as liabilities on the Bank of England's balance sheet) and they are liquid because they may be immediately withdrawn in the form of currency.[2]

UK banks and building societies: consolidated account. Sterling balances, £ billions					
liabilities	Sept.07	Aug.10	assets	Sept.07	Aug.10
private sector deposits	2,167.9	2,665.9	£ currency (vault cash)	9.0	9.2
public sector deposits	48.7	33.4	reserve deposits at BoE	31.9	150.1
repo loans from BoE	56.0	19.0	govt and private securities	150.4	434.7
net other	198.6	-50.0	loans to UK private sector	2,279.9	2,074.3
	2,471.2	2,668.3		2,471.2	2,668.3

Bank of England (BoE), £ billions					
liabilities	Sept.07	Aug.10	assets	Sept.07	Aug.10
£ sterling currency	40.4	51.4	government securities	2.4	218.8
bank reserve deposits	31.9	150.1	repo lending to banks	56.0	19.0
government deposits	1.0	1.8	net other	14.9	-34.5
	73.3	203.3		73.3	203.3

Simplified balance sheets for UK banks and the Bank of England. The two dates are chosen to show the changes at the Bank of England due to quantitative easing. See section 2.4

Source: Monetary and Financial Statistics, Bank of England ('Bankstats'), September 2010, tables B1.1.1, B2.1, B2.2, B2.2.1

However, as currency earns no interest, the banks keep stocks of 'vault cash' that are only a small fraction of their deposit liabilities (see balance sheet). To provide liquidity, the banks hold reserves that (since 2006) earn interest at the bank of England's official 'bank rate' (currently 0.5%,

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[1] During the early 2000s, *securitisation* became increasingly popular. By packaging loans into 'asset backed securities', this enabled banks to sell their illiquid assets in exchange for cash, enabling further lending. This practice ceased abruptly after 2007 (see section 1.4).

[2] Some central banks oblige their banks to hold *required reserves* as a minimum ratio (e.g. 2%) of their own short-term deposit liabilities. However, contrary to some claims, the ability to vary this ratio is not an additional tool of monetary policy, given functioning interbank markets. The Bank of England's demands 'cash ratio' deposits of 0.25% of banks' short-term liabilities which are effectively a reserve requirement but they play no part in the operation of monetary policy.

November 2011), and also other interest-earning securities such as bank bills and government bonds. These assets are liquid as they may easily be sold in the financial markets or used as collateral security for loans from other institutions. The banks holdings of reserves increased markedly during 2009-10 as a result of *quantitative easing* (see Section 2.4 below).

When a retail payment is made, for instance by a cheque drawn on the payer's bank account which the payee deposits in a different bank, this implies that the paying bank owes the amount of the cheque to the receiving bank. The wholesale debts between banks that are thus created by retail payments may be settled in a variety of ways: for example by transfers of bank reserves, by sales of assets, by loans that are secured on assets or by unsecured interbank loans. Settlement by transfers of reserves has become more common since these began to bear interest.

Note that these transactions are between the banks – one bank's loss of a deposit is another bank's gain – hence they will not cause any changes on the consolidated balance sheet of the banks presented above and are not relevant for monetary policy. The transactions that are of interest to us here are those that involve the central bank.

1.2 The Bank of England's money-market operations

While the major central banks all follow similar procedures, the following is a simplified description of the operations normally carried out by of the Bank of England. The special measures that it adopted following the financial crisis and the subsequent recession are discussed in Section 1.4.

Suppose that individuals decide to hold more currency, as they regularly do during holiday seasons, and they draw on their bank deposits for this purpose. Since commercial banks only hold small stocks of banknotes ('vault cash'), they must obtain the extra currency from the Bank of England. In terms of the above balance sheets, deposits at banks fall while the currency liability of the Bank of England rises.

How will the banks pay the Bank of England for the extra currency it has issued to them? They pay by drawing on their reserve deposits and the relevant bookkeeping entry will be a reduction in bank reserves equal to the amount of the extra currency.

Changes in banks' reserves at the Bank of England are the balancing entry whenever any of the central banks' other liabilities or assets change. As another example, suppose that the government draws on its accounts at the central bank in order to make a payment to a creditor in the private sector. When this payment is deposited into a bank, this gives rise to a debt of the central bank to the commercial bank which again is settled by a change in bank reserves, in this case an increase.

Finally, the Bank of England provides funds to banks by granting them 'repo' loans (or 'repos': shorthand for 'sale and repurchase agreements') which are, in effect, secured short-term loans[3].

If banks collectively run short of reserves, for instance after a rise in currency demand, they can always obtain funding in this way. The Bank of England may also use repos or reverse repos deliberately to influence the banks' reserve positions.[4] The interest rate charged for repo lending is close to the *bank rate* which it pays on reserve deposits.

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[3] Under a repo or 'sale and repurchase agreement', the bank sells the central bank a security (such as a government bond or 'gilt') with an agreement to repurchase it later (usually 2 weeks later; recently the Bank has also been making repo loans for longer periods of up to a year). A repo amounts to a loan to the bank backed by the collateral of the bond (and it is therefore shown on the above balance sheet as a bank liability: 'repo loans from BoE'). Interest is effected as the difference between the sale and repurchase price of the bond.

[4] The Bank of England sometimes also undertakes 'open market operations' which are outright purchases or sales of government securities from/to the financial markets. Confusingly, the Bank also includes repo lending in the category of what it calls 'open market operations'.

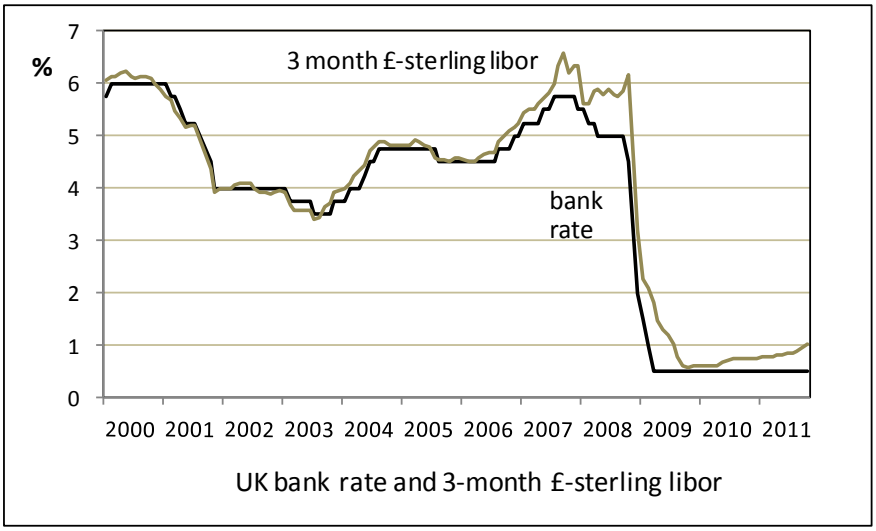
The important point is that, by its own dealing in the money-market, the Bank of England supplies funds (provides *liquidity*) to the banks *on demand*. It cannot do otherwise. This is fundamentally because the Bank of England is, by law, the only issuer of £-sterling banknotes – this is the defining difference between a central bank and other financial institutions. And all financial liabilities denominated in sterling are ultimately claims on sterling currency, the most obvious example being 'sight' deposits in commercial banks which the depositor can withdraw as currency on demand.

To enable the banks to satisfy their depositors' demands for currency, the Bank of England must stand ready at all times to lend its currency to the banks. If it failed to do so, or even if there was suspicion that some bank would be unable to honour demands for currency withdrawal, the likely consequence would be a bank run as happened, remarkably, with Northern Rock in 2007.

Since the Bank of England cannot choose the amount of such lending, it has to choose the interest rate at which it lends. This *bank rate* is the marginal cost of funds to the banks, measured either as the cost of short term repo loans or equivalently as the rate paid on reserve deposits. This rate is transmitted to the wider economy as the short-term rate for lending £-sterling funds, as is explained in the following section.

1.3 Interest rates in the money-market and banks' retail rates

With the central bank lending to banks as required at its chosen bank rate, short-term lending between banks will also normally take place at rates that are close to bank rate. Provided that lending banks are confident about the solvency of borrowing banks or the quality of collateral security being offered, no bank would be able to obtain a rate higher than bank rate for a loan to another bank when that bank can borrow from the central bank at bank rate; similarly, the lending



bank will not lend at less than bank rate when it can obtain bank rate on its reserve deposits. It does not matter that the values of the central bank's transactions are tiny compared to the overall values of interbank deals. The routine practice of the central bank, of lending to banks on demand, means that the wholesale rates for interbank lending (the 'libor' rate, for instance) remain close to bank rate.[5]

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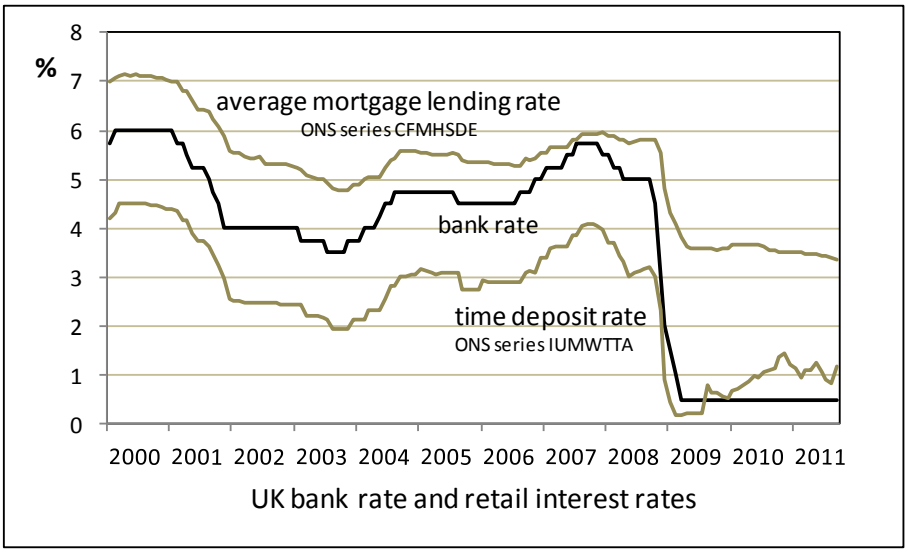
[5] Interbank rates became detached from bank rate during the financial crisis, reflecting lack of trust between the banks. For instance, the one month sterling interbank rate (Libor) reached as far as 1½% above bank rate in late 2008 but this margin later narrowed to around 7 basis points. During 2011, interest rates for unsecured lending between UK banks have been rising again (see chart showing the 3-month sterling libor rate), presumably because of exposure to eurozone

Hence, if banks have enough liquid assets (bills and bonds) which they can sell or use as collateral security, they can effectively borrow unlimited amounts of funds in the money-market at around bank rate or directly from the central bank.[6] What interest rate will they offer for deposits? Deposits and interbank borrowing are alternative sources of funds so, as competitive profit maximisers, they set the rate offered on deposits at some margin below bank rate to cover administration and transactions costs (see chart).



Similarly, the rate charged by banks for their lending to individual and corporate borrowers will normally exceed bank rate by a margin to cover transactions costs and also default risk. In other words, the banks set their retail lending and deposit rates at appropriate margins above and below the official bank rate of the central bank. When bank rate changes, the banks' retail rates change approximately in parallel.

The other consequence of the central bank's provision of liquidity is that the commercial banks' retail lending decisions are not dependent on their having sufficient deposits. Hence, when a bank has an opportunity to lend, its decisions over whether to lend, how much to lend and at what interest margin, may be taken mainly on the basis of the perceived risk. Commercial banks do not wait for deposits before lending, as would be implied by the textbook 'money multiplier' theory. Because central banks routinely provide liquidity to their commercial banks, the banks know they can normally fund their lending by borrowing in the money-market at rates close to the central bank's lending rate.

However, for some banks that had become over-reliant on short-term money-market funding, this method of working broke down dramatically after the onset of the financial crisis in 2007, when the quality of their assets fell under suspicion and other banks were unwilling to roll over their loans. At the end of 2008, the relationship between bank rate and the commercial bank's retail rates also

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banks. Irish and Greek banks are currently reported to be closed out of interbank funding and thus heavily reliant on the European Central bank (November 2011).

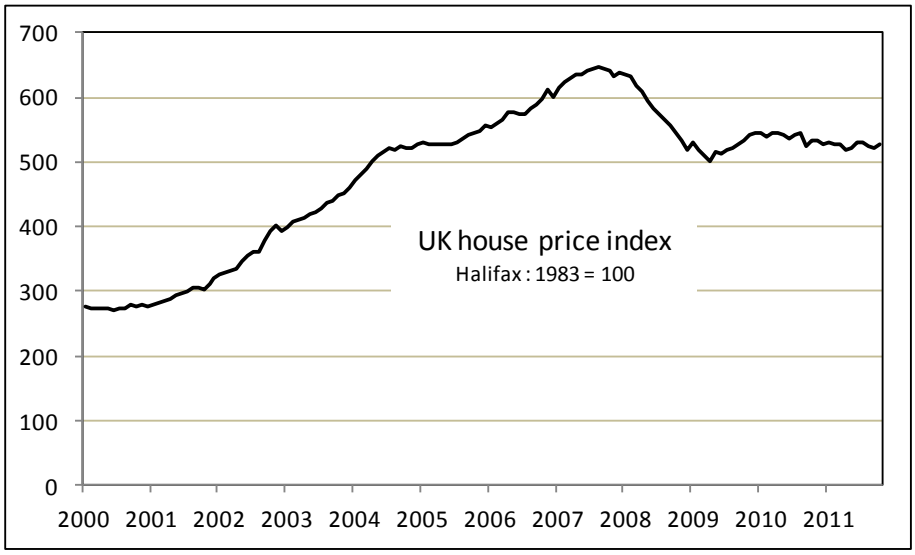
[6] This raises the question of what happens when banks run low on liquid assets. Obviously, a bank attempts to maintain its portfolio of liquid assets, but it may have difficulty if it suffers from a large number of non-performing loans. Since the financial crisis, the European Central bank has reduced the quality of assets against which it will lend and it is (temporarily) prepared to accept assets classed by the ratings agencies as 'junk'. It can be argued that this amounts to solvency support; see section 1.4.

changed as bank rate was rapidly reduced from 5% to 0.5% but retail rates did not fall so far (see chart). Since that time, lending margins have remained higher than before and many banks are now offering rates for short-term (e.g. 1-year) time deposits that are greater than bank rate.

This is a result of a change in the banks' strategy together with impending tighter regulation. After aggressive expansion of lending up to 2007, the banks are now rebuilding their balance sheets to raise their capital ratios and reduce the proportion of lending that is funded by interbank borrowing rather than deposits. The irony is that, whilst the British government is encouraging this behaviour by means of regulation, it is also pressing the banks to increase their lending. The government cannot have it both ways.

1.4 Effects of the financial crisis and the recession

In late 2007, it became clear that some banks had been lending too freely and too cheaply, particularly for home loans, driving up asset prices to unsustainable heights (see house price index chart). In both the United States and Britain, mortgage loans were being granted in amounts that were six times the borrower's annual income and up to 125% of the value of the secured property, and the risks had become seriously underpriced. When house prices started falling and significant numbers of loans began to default (initially in the 'subprime' market in the US) there was a widespread fall in confidence in the banks and several had to be bailed out or recapitalised by governments.



One of the factors which drove this expansion in lending and also played a major part in the banking collapse was *securitisation*, in which a bank pools together several hundred loans to create an *asset backed security*. This may then be divided into *tranches* with a prescribed order of payout when some of the underlying loans default on payments. In a typical structure containing a *senior*, a *mezzanine* and a *junior* tranche, the first losses are borne by the junior tranche, and the mezzanine tranche only becomes impaired when the losses exceed the entire amount of the junior tranche. Similarly, the senior tranche only suffers if losses exceed the amounts of the mezzanine and the junior tranches, making it much more secure than the original pool.

The senior tranche is thus *credit-enhanced*, invariably gaining the highest rating from one of the credit rating agencies, and it becomes an attractive investment to other institutions. The process enables banks to turn risky loans into assets that can be sold in the financial markets, freeing up cash for further lending. Under existing bank regulations, it also enables institutions that own senior

tranches to hold smaller amounts of regulatory capital than if they held the original assets, thereby increasing leverage.

In the years prior to 2007, the issue of asset backed securities grew at an increasing rate, reaching a global value of around $10 trillion in mid-2007[7], with banks in most developed countries becoming involved as originators of these securities, or buyers, or both. And as the market expanded, more complex financial instruments were introduced such as *collateralized debt obligations* which are, for instance, securitised assets created by combining several mezzanine tranches of previous securitisations. These developments had the effect of concealing risk and the new assets were increasingly hard to value. When the market finally collapsed, many of them were written down to a fraction of their face values, earning the label 'toxic assets'.

During 2008, this rapid deterioration in the value of bank's assets quickly led to justifiable suspicions about the solvency of many banks including several of the world's largest. As a result, banks became reluctant to lend both to their retail customers and to other banks. The money markets seized up. Faced with a potential collapse of payments systems, governments and central banks had no alternative but to support vulnerable banks, by providing liquidity for longer periods and against lower quality assets, by guaranteeing banks' assets, and by injecting capital, in some cases amounting to partial or complete nationalisation.

The sudden reduction in the availability of credit, accompanied in Britain and the US by sharp falls in property prices, led to recession[8] in all major economies. Governments generally responded with stimulatory (Keynesian) fiscal policy, but the scope for extra spending or for tax reduction was limited because government budgets everywhere were severely stretched. Budget deficits had already risen markedly because of the recession-induced reduction in tax revenue and increased welfare spending (the 'automatic stabilisers') and because of the support given to the banks. The high levels of government debt in many countries are now a serious threat to economic recovery.

The other arm of economic policy, monetary policy, was also used aggressively in attempt to mitigate the recession and central banks rapidly reduced their interest rates close to zero. As nominal interest rates cannot fall below zero, other measures were then introduced such as the Bank of England's *quantitative easing* (see section 2.4).

2. How does the central bank *choose* the interest rate?

2.1 The effects of changes in interest rate

The next task is to consider how the central bank should choose the value of its control instrument: the short term interest rate (bank rate). For this purpose, the objective of monetary policy needs to be defined and these days it is invariably a target for inflation. The target may be explicit, like the UK's inflation target of 2% (consumer price index)) with a margin of error of ± 1 %, or it may be stated more loosely, like the instruction to the European Central Bank to aim for "low and steady inflation" which it interprets as below but close to 2%.

Sometimes the central bank is also explicitly instructed to aim for high economic growth, as in the US, but it must be borne in mind that a single *instrument* (the interest rate) cannot be used to target more than one *objective* at the same time. Raising growth would call for lower interest rates, while

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[7] Estimate from Bank of England Stability Report, October 2007.
[8] A recession is defined as four successive quarters of negative real economic growth.

reducing inflation would require higher interest rates. However, even though central banks are always more or less conscious of the effects of their interest rate choices on economic growth, the main focus is on inflation.

The central bank therefore needs to know how inflation is affected by its interest rate choices. The main impact of interest rate changes is on aggregate demand – a reduction in interest rate tends to raise demand, and vice versa. Depending on supply capacity, higher demand leads to higher real output and higher inflation or both, where the change in real output is usually thought to be temporary according to Phillips Curve theory.

Unfortunately, there are also other influences on demand which are not easily measurable or predictable such as 'confidence' and 'habits'. This leads to considerable uncertainty in the magnitude of the responses to interest rate changes and the responses are also delayed: the peak of the response of inflation to a change in short-term interest rate is lagged by 18 months or more. It is nonetheless important to study the channels by which interest rates are believed to influence demand, and I give a brief overview.[9]

Consider the consequences of a *reduction* in the Bank of England's official bank rate. Most bank loans in the UK are at a variable interest rate, such as variable-rate mortgage loans for house purchases and overdraft loans which are the main type of finance for smaller firms. When bank rate falls, the cost of this finance falls, and this tends to cause an increase in borrowing, both for consumption and investment. The reduction in interest rates also reduces the reward to saving, which also encourages spending.[10]

Another important influence on demand is the *wealth effect*. When interest rates fall, the prices of both physical and financial assets rise. Financial assets such as bills and bonds are claims to specified future nominal amounts of cash; hence their nominal values rise to bring the return on these assets in line with the lower rate of interest. For physical assets such as property, the raised demand due to the lower cost of borrowing tends to raise prices. The higher value of these assets makes individuals and firms more confident about spending and also provides increased collateral security for increasing their borrowing.

These effects were well illustrated by the British experience of 1985-95. In the late 1980s, the prices of assets, particularly houses, rose rapidly as a result of declining interest rates and aggressive marketing of loans by banks which had recently enjoyed some deregulation. The consequence was high demand and output growth followed by rising inflation (see chart below). With the very high inflation of the 1970s still in mind, the government responded by raising bank rate sharply (at the time, policy interest rates were chosen by the finance minister, not the central bank). The decision, in 1990, to join the Exchange Rate Mechanism (ERM) of the European Union meant that higher bank rates were forcibly continued even as inflation fell (because of the uncovered interest parity condition).

This policy eventually succeeded in overcoming inflation but it also caused a serious slump, with the usual features of falling demand and output and widespread bankruptcies. It was also notably characterised by falling property prices and 'debt deflation' as many property owners were unable to

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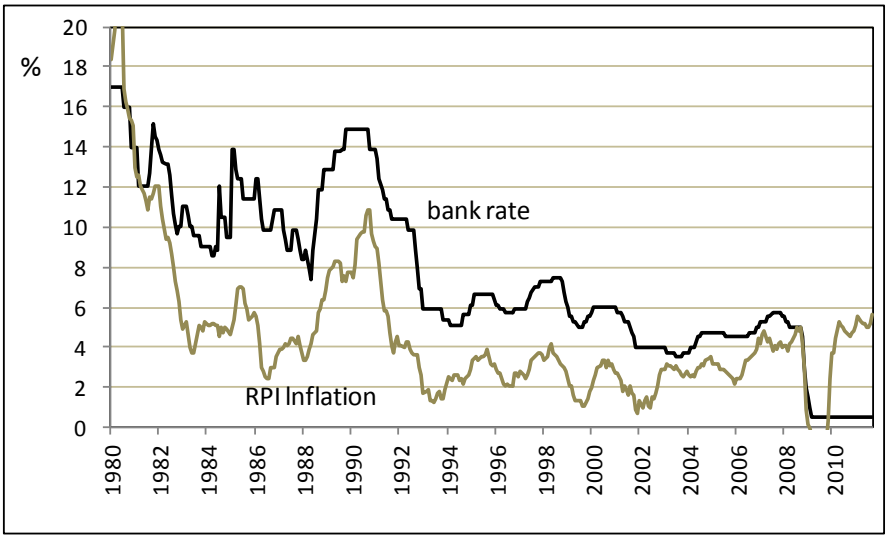
[9] A more complete description of the effects of interest rates is in "The Transmission Mechanism of Monetary Policy", Bank of England Quarterly Bulletin, 39.2, (May 1999), p.161-70.

[10] The effect of a reduction in interest rates on savers could be the opposite, i.e. it may cause greater saving rather than less, if savers who want to maintain a given income stream from their interest payments. The outcome depends on the relative magnitudes of the 'income and substitution' effects in standard microeconomic theory of intertemporal choice.

maintain interest payments on their loans. Bank rate was markedly reduced when Britain left the ERM in 1992, and average real growth then gradually returned to its 'normal' level of around 2.5%. This experience has obvious parallels with current economic conditions in Britain, although growth has not yet properly recovered.



A further influence on demand works through the foreign exchange rate. However, this link in the transmission mechanism is particularly unreliable because (with no restrictions on capital flows) foreign exchange rates are more strongly influenced by changes in perceptions of returns on capital for reasons other than changes in interest rate. To the extent that interest rates have an influence, a lower interest rate is usually associated with a lower foreign exchange value of the currency. A weaker currency then stimulates aggregate demand because it raises exports.

These are the main channels whereby interest rates are understood to influence aggregate demand. The direction of the overall effect is not in dispute: there is agreement that lower interest rates stimulate demand and vice versa, as would be predicted by any model of the 'IS' curve.

However, as already mentioned, the responses to interest rate changes are not accurately predictable and may be dominated by unquantifiable influences such as 'confidence'. In recessions, for instance, lower rates may have little effect on spending because individuals are naturally reluctant to incur further debt, as is currently the case in Britain. This 'liquidity trap' has been afflicting Japan for a number of years during which interest rates have hardly risen above zero.

Another matter that needs attention is that bank rate is a short-term rate while much expenditure, particularly for investment, is more dependent on longer term rates. We must consider how the *yield curve* (the relationship between interest rates of different maturities) is influenced by *expectations* of future short-term rates.

2.2 The role of expectations

The pure expectations hypothesis of the term structure of interest rates states, loosely, that the interest rate for a loan of maturity T years is an average of current and expected future short-term rates over the following T years.[11] The very-short-term rate (bank rate) is set by the central bank, at

[11] While the expectations hypothesis is valuable for explaining the term structure of interest rates, there are other influences. In considering the rates for government bonds, for instance, these are clearly influenced by the 'weight of

a level that is designed to cause the inflation rate to converge towards its target; therefore, an important influence on long-term rates is the expectation of future inflation. If the expectation of future inflation is revised upwards, this will raise the expectation of bank rate in the future and this, in turn, will raise current long-term rates.

It also follows that, when bank rate changes, this can cause changes in long-term rates in either direction, depending on how the change in bank rate causes expectations of future bank rates to be revised. If a change in bank rate is fully anticipated and does not affect expectations, longer-term rates will be unaffected. But if the bank rate change is a surprise, or smaller or larger than expected, this represents new information and longer rates will change too. An unexpected fall in bank rate, for instance, would cause longer rates also to fall. Conversely, a fall in bank rate that is smaller than expected would cause longer rates to rise.

Clearly, all information that causes revisions of expectations of the future path of bank rate is important, not just current changes in bank rate. If, for instance, the governor of the central bank makes a statement implying that bank rate will be lower in the future and this statement is believed, then this will also reduce long-term rates and tend to stimulate demand.

For these reasons, great weight is attached to the statements of central bank governors; anyone who can correctly predict a change in rates that is not already reflected in the term structure stands to make profits by appropriate dealing in financial assets. Every word from the Bank of England's monetary policy committee is scrutinised by analysts searching for clues about their future intentions. In practice, there are many signals that influence expectations of interest rates, not least the monthly publications of inflation rate statistics, since these data have a bearing on the central bank's interest rate setting decisions.

To summarise so far, reducing the interest rate tends to stimulate demand and it may eventually lead to higher inflation. Conversely, raising interest rates tends to reduce demand and inflation. But there are many other influences on demand and inflation, which makes the magnitude and delay in the response of inflation to a change in interest rates hard to predict. It is against this background that the central bank must choose the bank rate that is most appropriate for achieving its inflation objective.

2.3 The central bank's choice of interest rate

The prevalent arrangement nowadays is that central banks are *independent* (the Bank of England has been independent since 1997). This means that the government chooses the *objective* of monetary policy, usually specified as an inflation target as described above, while the job of the central bank is to choose a time path for bank rate that is most likely to achieve that objective.

As a result of the lags in the response to interest rate changes, the practice of the central bank is sometimes called *inflation forecast targeting*. The Bank of England, for instance, uses its macroeconomic model to forecast inflation up to 2 years in the future and, if the mean 2-year forecast differs from the target, bank rate should be adjusted accordingly. But although much

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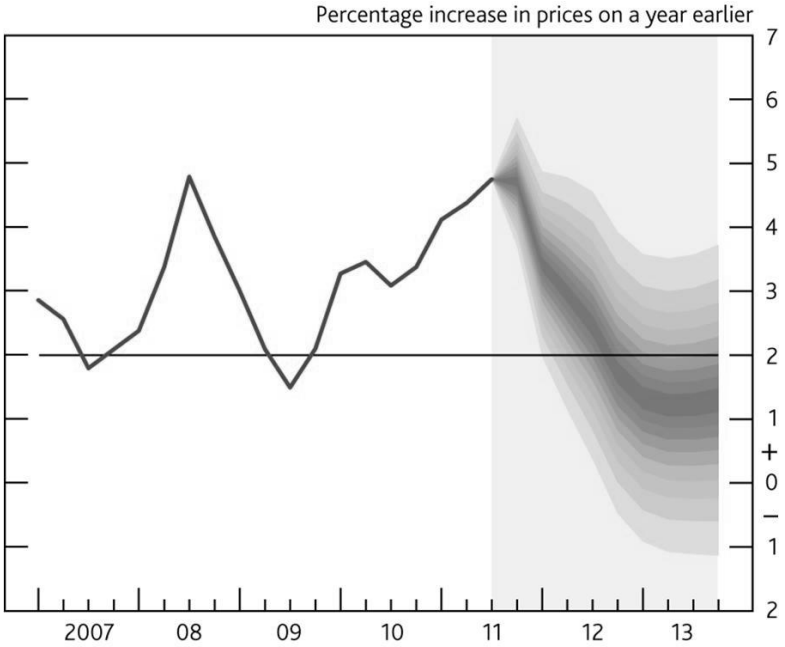
funds': the supply of bonds by the government and the demand for them by investors. Yields also generally include a premium for default risk, which can be large for corporate bonds and is currently very large for the government debts of several 'peripheral' eurozone countries such as Greece and Italy.

research has been directed towards devising 'monetary policy rules' (such as the Taylor rule[12]) that might direct central banks in their choices of optimal interest rates to reach a given target, the predictions of any model are very uncertain. In practice, while inflation forecasts and 'monetary policy rules' can be used as a guide, interest rate choices have to rely on judgement. In the UK this judgement is the work of the members of the Bank of England's monetary policy committee.



The Bank of England's forecasts of CPI inflation.
Note the wide uncertainty (the 'fan chart' includes 90% of the probability distribution).
Bank of England inflation report, November 2011

The purpose of central bank independence is to insulate monetary policy choices from interference from the government, as the government may face incentives to choose interest rates that are not always consistent with the inflation target. It is often assumed that governments have a shorter time horizon than the society they serve; therefore, they might be tempted to hold down interest rates to stimulate spending ahead of an election, disregarding the longer-term potential consequence of inflation.

Another incentive for governments to go 'soft' on inflation is that inflation helps the government budget. When price levels rise, the demand to hold currency also rises, so inflation provides governments with extra *seigniorage* (the income from issuing currency). Inflation also reduces the real value of (home-currency, non-indexed) government debts. But for this to be of benefit, inflation expectations must be low when the government borrows (by selling fixed-interest bonds); if high inflation was expected, bond rates would also be higher to reflect this.

If a government wishes to finance its debts most cheaply, its best strategy is to induce the belief that there will be low inflation so that it can borrow cheaply, then to cheat by allowing some inflation to

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[12] The Taylor rule may be stated: $r - \pi = r^{\dagger} + 0.5(y - \bar{y}) + 0.5(\pi - \pi^{*})$ where r is the central bank's policy rate (bank rate), π is the inflation rate, $r^{\dagger}$ is the long-run real rate of interest, y is real output, $\bar{y}$ is the natural rate of real output and π^{*} is the inflation target. This says *r* should be set so that that the real rate of interest $r - \pi$ is above (below) its long run level when output is above (below) its long-run level and/or inflation is above (below) target. While there is evidence that the Taylor rule may have been a reasonable *description* of policy, it is not used as a *prescription* by central banks for their interest rate choices.

write down the real value of its debts. But this strategy cannot be repeated indefinitely and it has sometimes been the route to hyperinflation.

This is the main justification for central bank independence: it is supposed to give *credibility* to monetary policy. If the central bank is insulated from the incentives that tempt the government, people are more likely to believe that it will genuinely try to meet its inflation target.

This is important because the expectation of inflation is an important determinant of actual inflation, as recognised in Phillips Curve theory. Inflation is the rate of increase of the prices of goods. In the attempt to find clearing prices, sellers of goods build the expected rate of inflation into their price increases, and inflation expectations are also built into wage agreements. This leads to *persistence* in the observed time path of inflation.

Is full independence for the central bank actually possible? It is hard to ensure that the individuals who make up the monetary policy committee are wholly insulated from political influence. This is especially relevant to the European Central Bank, whose policy board contains representatives from all the national central banks of the eurozone. Although the Maastricht Treaty specifically states that the ECB must be rigidly independent of national interests, the political dimension is always present and there have been tensions. It seems that German interests have been dominant, as the choice of the euro interest rate (the euro 'repo' rate) has generally been more appropriate for Germany than the Southern eurozone countries (Italy, Spain, Greece, Portugal), leading them first into inflation and then slump.

Whether or not central banks can be or should be wholly independent, this arrangement does seem to have worked in achieving and maintaining low inflation in developed Western economies. Germany and Switzerland are believed to have had the most independent central banks since the last war and also the best records of inflation control.

2.4 Quantitative easing

In the UK, the Bank of England bought £200 billion of medium and long-term government bonds (gilts) in the secondary market between March 2009 and March 2010, which it still holds (see balance sheet, page 2). It is now (January 2012) in the process of buying a further £75bn. This *quantitative easing* (QE) can be considered as an extension of monetary policy. It is an attempt to provide further stimulus to economic activity given that bank rate cannot be reduced below zero and, at 0.5%, it is effectively at its lower limit.

There have been two QE programmes so far in the United States. In the first, the Federal Reserve purchased of $1.7 trillion of assets, mainly US government bonds and mortgage-backed securities; in the second, the Fed bought a further $600 billion of government debt and it has now begun 'operation twist': the purchase of $400bn long-term US government debt in exchange for short-term debt. In the eurozone, the European Central Bank has bought €217bn (January 2012) of government debts of the 'peripheral' countries (Greece, Portugal, Ireland, Spain and Italy) to try to hold down yields on these debts. The ECB does not call this policy quantitative easing, but it amounts to the same thing.

To the extent that QE in the UK had a useful effect, the main channel by which it worked is thought to have been via a reduction in medium and longer term rates of interest: interest rates on government debt fell by about 1% during 2009 (the 'weight of funds' effect: footnote 11) and corporate yields also fell as lenders sought substitutes for the bonds bought by the Bank of England. While monetary policy in 'normal' times is the Bank's choice of bank rate which is a very short-

term rate, QE seems to give the Bank an additional handle over longer term interest rates. Whether or not the reduction in yields was caused by QE, it was helpful to businesses that could finance themselves by issuing debt.

It was also hoped that QE would encourage banks to increase their lending, given that much of the cash that the banks received as a result of QE remained as bank reserves at the bank of England (balance sheet, page 2). However, bank lending remains constrained both by supply and demand. Having recently burnt their fingers, banks are looking much more carefully at risk and have increased their lending margins (see chart, page 5) while their borrowers, individuals and firms, are trying to save rather than taking on more debt, given anxiety about future income and cash flow.

The Bank of England has recently suggested that its current QE programme may be extended. But there are doubts that this would have any stimulatory effect at all, as there is little room for long rates to fall further. Some members of the Monetary Policy Committee have also argued that this stimulus could cause a return of inflation.

This inflation worry arises from the claim that QE constitutes 'monetisation' of government debt – the Bank of England is paying for government spending with new 'money' (cash reserves). The increase in bank reserves means an increase in the *monetary base*, M0 (defined as banknotes and coin plus bank reserves) and the quantity theory of money says that the price level rises roughly in proportion to the money supply, measured as M0 or some broader measure such as M4 which includes deposits in banks.

The problem with this reasoning is that it ignores the mechanism by which inflation is caused. Inflation is rising prices of goods, and it is caused by excess demand for goods, something that is notably absent at present. Consistent with this, M4 has hardly been growing at all because bank lending is not growing. If and when inflation threatens to return, the Bank says it will be withdrawing QE. Even without a withdrawal of QE, there is nothing to prevent the Bank achieving higher interest rates by raising its bank rate on bank reserves and its repo loans.

Having said that, inflation is the one sure way in which the government could write off some of its debt, as described above in Section 2.3. When the UK economy does eventually return to sustainable economic growth, the government may thus be tempted to lean on the Bank of England to continue its 'soft' monetary policy for longer than is strictly consistent with its inflation target.