Monetary policy instruments: the UK experience

Taking examples from the history and the current structure of UK money markets, Mervyn King, an Executive Director of the Bank and its Chief Economist, provides[1] *an analysis of a number of the features of money markets and monetary policy instruments. He distinguishes features which are fundamental to any structure, those which derive primarily from the history of the particular markets and those which are likely to be more transient. He identifies two criteria for measuring the efficiency of money-market structures. And he highlights a set of issues that need to be addressed in shaping any money-market structure, including that to be used in Stage 3 of EMU.*

Introduction

It is a privilege to join you this morning—and especially my colleagues Otmar Issing, André Icard and Nout Wellink—to discuss the instruments with which we conduct monetary policy. Stage 2 of Economic and Monetary Union began on 1 January this year, and this is an apposite time to reflect on our domestic monetary operations and the experience of our colleagues in the rest of Europe. It is also a great pleasure to address a symposium organised by the Institute for Bank-Historical Research; few activities of central banks have been more influenced by historical circumstances than operations in money markets.

Since, as the chairman noted, I arrived this morning straight from the Bank of England's Tercentenary Symposium, I hope you will permit me to start my talk with some words of that great observer of the London money markets, Walter Bagehot. In 1873, he wrote that 'you might as well, or better, try to alter the English monarchy and substitute a republic, as to alter the present constitution of the English Money Market, founded on the Bank of England' (Bagehot 1873). And, as with much of Bagehot's thinking, how prescient it has proved. The present constitution of the London money market—more than a century on from Bagehot—owes much to history. That alone, of course, does not make it any better or worse a constitution than any other. But the British tradition of unwritten constitutions means that we attach great importance to our ability to adapt to changing circumstances by changes in what we do, rather than changes in what is written down about what we do—although the Bank's 'Red Book' provides a great deal more enlightenment on our monetary constitution than is available on our political constitution (Bank of England, October 1988).

My aim today is to clarify why some of the features of the UK money market, and the Bank of England's operations within it, are in fact basic to any system; why other features derive primarily from the history of the money markets in London; and why yet a third set of characteristics has proved rather more transient—often those based upon specious economic arguments which did not stand the test of time. I will highlight a set of issues—by no means exhaustive—which I think are central to monetary policy, monetary instruments and the money markets generally. Inevitably for an institution in its tercentenary year, I have in places been rather selective, both in the fragments of Bank of England history I have assembled and in the issues on which I have chosen to focus. But I hope they will provide a backdrop to the forward-looking discussion that is to come between myself and my central bank colleagues in the panel later this morning.

Monetary policy and the money markets

Let me begin by going to the heart of the matter of how and why central banks interact with the money markets. Central banks differ from commercial banks because of the uniqueness of their liabilities—base, or central bank, money. And base money is in turn unique because it is the final means of settlement for transactions. It follows that provided a market demand exists for base money, then as monopoly supplier a central bank is able to exercise control over either the price or the quantity which clears the money market. This base money demand can be manufactured artificially by the central bank—for example, by selling securities or imposing positive reserve requirements. But in economies like ours, which are subject to stochastic shocks to payment flows, such a demand will tend to arise naturally for most of the time; it needs no artificial stimulus.

It is important to note two points about this argument. First, as Bagehot recognised, the actual size of the disequilibrium in the base money market is irrelevant to the central bank's ability to set a price or quantity—this requires only that the central bank be the marginal source of funds. And second, it does not matter in principle whether the disequilibrium in the money market is an aggregate net shortage or a net surplus of funds—control of prices or quantities carries across irrespective of whether the central bank is the monopoly supplier or demander of its own liabilities. Either way, it plays a pivotal role in the money market.

(1) In a paper for the 17th symposium of the Institute for Bank-Historical Research in Frankfurt, delivered on 10 June. The symposium was also addressed by, among others, the directors with responsibility for economic research at the Bundesbank, the Bank of France and De Nederlandsche Bank.

This role gives a central bank one degree of policy freedom—no more and no less. Whether this is used to exercise control over the price or the quantity which clears the base money market is a matter of choice—and I will discuss this choice later. But comparative work on central banks, both across countries and across time, demonstrates that exercising influence over short-term interest rates—the price or opportunity cost of central bank money—has been the most important and long-lived common denominator among the various instruments of monetary control used by central banks across the world. This is true both for the price of present central bank money relative to future central bank money (the interest rate), and for the price of central bank money relative to foreign central bank money (the exchange rate).

Consider the UK experience in this respect. During the nineteenth century, the Bank of England devoted considerable attention to making bank rate 'effective'. This was of particular importance under the Gold Standard, when the Bank was seeking to influence market interest rates in order to control inflows and outflows from the nation's gold reserves. Even then, the position of the Bank of England within the financial system provided it with the means of influencing short-term rates in the money market, at least up to the point at which it provoked an inflow or outflow of gold.

This influence has persisted to date. Its incarnations through the nineteenth and twentieth centuries have been, first, bank rate; then, through the 1970s and on occasions since then, minimum lending rate; and, most recently, the Bank's dealing rates with the discount houses—the specialist intermediaries through which the Bank has conducted its money-market operations since early in the nineteenth century. These names are of little more than historical interest. For in each case what was being set was essentially the same—the price of central bank money. Indeed, dealing rates were historically the means by which announced bank rate and minimum lending rate were made 'effective'.

Influence over short-term interest rates has been maintained despite massive changes in the nature and structure of the financial system—liberalisation of markets, abolition of exchange controls and changes in the market power of the major banks. The degree of competition among banks in the United Kingdom has changed greatly over time. The process of amalgamation of small banks into larger units in the late nineteenth and early twentieth centuries created a group of major clearing banks exhibiting cartel-like behaviour from the First World War until the early 1970s. Since then competition has intensified, although a small number of large banks have an influential role in the UK money markets.

Short-term interest rates have not always assumed primacy as a monetary instrument. In the 1950s and 1960s, interest rates were relatively little used. This was mainly because interest rates were felt to be relatively ineffective as a demand management tool. In a world of pervasive controls, quantitative constraints on credit bit harder and faster. Without question, however, interest rates have become the predominant instrument since the monetary control reforms of 1971 and 1980–81.

Although I do not wish to deny the historical importance of non-price instruments of monetary policy, the interesting question to ask is why do central banks prefer interest rates over money quantities as their primary monetary instrument?

The instrument problem: prices and quantities

This question was posed by William Poole in a seminal paper back in 1970. Interest rate control was to be preferred, Poole argued, whenever money-demand shocks were more important than shocks to real spending. Shocks to money demand would then be passively accommodated in the money market, thus stabilising nominal spending. When shocks to real spending were the more important, control of the monetary base was the more likely instrument to stabilise nominal spending. Poole's conclusions have proved remarkably robust.

In the United Kingdom, the monetary base control debate was alive most recently in 1980. The conclusion then was that 'we [the UK Treasury] doubt whether a monetary base control system . . . would produce the desired results. None of the schemes so far suggested appear to give a reasonable prospect of doing so'.

A critical factor in reaching this decision was that 'there would be a period of years before it could be established that there was a predictable relationship between money and the base and there would be no assurance that monetary control would necessarily be better at the end'. The arguments used at the time seem to me inconclusive. More relevant may be the US experiment with non-borrowed reserves targeting between 1979 and 1982 which, while not strictly money base control, led to a fourfold increase in the volatility of short-term interest rates.

But, before we leave the question of money base control, let us not forget Poole's analysis. What Poole showed was that a mixed strategy, combining control of both the monetary base and interest rates, was strictly superior to controlling either quantity or price in isolation. And in many ways I see the historic operating practices of most central banks—the Bank of England among them—as having been exactly such a hybrid. Let me explain.

Clearly, both money prices and money quantities cannot be controlled simultaneously. But time horizons are important here. If we looked at a central bank's money supply schedule over a short window, say a week, then it would appear horizontal, with the supply of the monetary base being perfectly elastic—consistent with interest rate targeting. But if we lengthen the window, say to a year, then the supply schedule begins to steepen—any persistent shocks to money, other than those resulting from a shift in the money-demand function, will cause central banks to engineer an interest rate response to control inflation. The

longer the window, the steeper the supply schedule and thus the more pronounced the interest rate response.

In the long run, the central bank's base money supply schedule could be vertical (adjusting for shocks to money demand)—consistent with the authorities setting a target for the money stock and hence for the price level. And, of course, at this stage we are back to a world of pure money base control. The point here is that the money price/quantity distinction is never as black and white as theory might suggest. Central bank policy rules are some fairly complex intertemporal mix—a mix which Poole has shown can be optimal.

Monetary instruments and monetary targets

Let me for a moment examine instruments other than interest rates. When considering these, UK history is very revealing. And by this I mean not just the history of how monetary policy in practice was conducted, but also the history of policy objectives, both final and intermediate. In the 1950s and 1960s, Keynesian demand management was the macroeconomic orthodoxy. The key policy objective was full employment, subject to maintaining external balance. Interest rates were held down, partly because demand was thought to be restrained by fiscal policy backed up by direct controls on credit, and partly because low rates helped to restrain the budget deficit. Monetary policy was tightened almost only when the external constraint was threatened—although this occurred frequently.

During the 1950s, direct controls on hire-purchase terms, qualitative calls for restraint on bank lending and controls on capital issues were widespread. Cash ratios (of 8% of deposit liabilities) and liquidity ratios (of 30%) were already in place and for most banks were binding constraints on balance-sheet growth. Bank rate adjustments, while important as a signal of restraint, were believed to be slow and ineffective in controlling aggregate demand. The use of quantitative controls reflected the widespread use of planning during the war, and the belief that if planning had won the war then it could equally 'win the peace'.

But there was clearly an efficiency cost to doing this. The Radcliffe Committee, set up in 1957, alerted the wider public to the significance of these distortions. Their report, published in 1959, concluded that the authorities must 'regard the structure of interest rates rather than the supply of money as the centrepiece of the monetary mechanism'. Direct controls should, in the main, only be used in extreme conditions.

The move to more market-oriented instruments was, however, delayed. In the 1960s, direct controls became, if anything, more specific in their application. Lending ceilings were imposed on all banks and finance houses, with guidance on lending giving priority to export finance; hire-purchase controls were progressively tightened; and a special deposits scheme was introduced, obliging banks to hold a proportion of their liabilities at the Bank of England, remunerated at Treasury bill rates but not counting as part of the banks' liquidity ratios, thus placing further pressure on banks' liquidity positions.

The 1970s marked something of a watershed. Two factors were responsible for this. First, a change in the intellectual climate led to a preference for market solutions. Second, there emerged a growing dissatisfaction with the deadweight efficiency losses resulting from a directly controlled financial system. Disintermediation had already begun to eat into the effectiveness of direct controls, as the UK financial system grew in size and sophistication during the 1960s. In 1971, a series of reforms was introduced, known as Competition and Credit Control (CCC). CCC served notice of the freer hand that was to be given to interest rates in monetary policy. Quantitative controls were dismantled, together with the clearing banks' interest rate cartel. Cash and liquidity ratios were retained, but at much lower levels—1½% and 12½% respectively—with the latter retitled 'reserve asset ratios'. The ability to call special deposits was retained, but with the intention that the option be exercised only infrequently to reinforce upward movements in interest rates. The key element of CCC was the emphasis placed on the level—and structure—of interest rates as the primary instrument for influencing the growth of money and credit.

Rapid bank balance-sheet growth followed the ending of direct controls. With the authorities reluctant to increase interest rates far or rapidly enough to limit inflationary pressures, direct controls were reintroduced sporadically throughout the 1970s. Hire-purchase controls, calls for special deposits and restrictions on the scale and direction of bank lending were old favourites. But they were buttressed by a new control—the Supplementary Special Deposit scheme or 'corset'. This was a penalty (in the form of non-interest-bearing deposits at the Bank) on the rate of growth of banks' interest-bearing eligible liabilities rather than on the size of the balance sheet as such.

Although these controls were in principle temporary, they persisted through much of the 1970s. Their downfall—this time for good—was inevitable as a consequence of a different liberalisation measure: the abolition of exchange controls in 1979. With banks' customers now free to borrow offshore funds to meet financing needs, domestic controls on banks' balance-sheet growth were rendered obsolete. By the end of 1980, all quantitative restrictions had been withdrawn (with the exception of a residual form of lending guidance which remained notionally in force until December 1986).

Among other reforms, the *corset* was scrapped. And while the option to call special deposits was retained, it has never been exercised subsequently, although it remains available. The cash ratio was also retained, but at a much reduced level of ½% and with a new name, *cash ratio deposits*. This requirement has since been progressively reduced and currently stands at just 0.35% of banks' eligible liabilities. Moreover, the function of cash ratio deposits today is strictly non-operational: they serve the sole purpose of providing income for the Bank. The fulcrum for money-market

management is provided by the requirement that the banks avoid overdrafts on their operational accounts. The reserve asset ratio requirement was also abolished as a monetary control device, although liquidity requirements were retained for supervisory purposes as a purely prudential measure, and therefore play a part in affecting banks' behaviour and thus the context in which the authorities conduct their monetary operations.

The effect of the 1980–81 reforms was, at long last, to focus the spotlight firmly upon interest rate management—a decade after CCC had first proposed this. The prime mover in this shift was unquestionably financial liberalisation—whose invisible hand was in turn steered by a new economic orthodoxy.

In this intellectual climate, monetary targets had risen to prominence as an intermediate monetary objective. The United Kingdom had been obliged by the IMF to introduce targets for domestic credit expansion in 1968. But the Bank made voluntary use of unpublished targets for broad money growth (at the time M3) from 1973 onwards. Annual target ranges were first announced in 1976, following their introduction in Germany and the United States. And this gradual progression reached its zenith with the publication of medium-term broad money targets by the incoming Conservative government in 1980. These were intended to influence inflation expectations over a medium-term horizon.

But there was to be a twist in the tail. Financial liberalisation and increasing competition among newly-liberated financial institutions caused banks' balance sheets to swell rapidly. Broad money targets came under threat. The authorities' reaction was to draw more heavily upon yet another instrument: debt management. The intention was to withdraw liquidity from the private sector by the sale of government debt—even at times in excess of that required to meet the government's borrowing requirement, so that it became known as *overfunding*—in order to hit the broad money target. In that way, broad money growth could be reduced. Overfunding operated between 1981 and 1985, until broad money targets themselves fell out of favour. Even overfunding was rarely sufficient to bring broad money growth back within its target range, and as a by-product it placed strains on the Bank of England's money-market operations by draining large amounts of liquidity from the money market.

Since the mid-1980s, interest rates have been pretty much the sole and exclusive monetary control tool of the UK authorities. Foreign exchange intervention has, on occasion, played a supporting role—when sterling shadowed the Deutsche Mark in 1987–88, and of course during the period of sterling's membership of the ERM. But outside these episodes, the use of intervention has been sparing. Its effectiveness is in any case short-lived without supporting monetary policy action.

The United Kingdom's new monetary framework, introduced following sterling's departure from the ERM in the autumn of 1992, is based on the use of interest rates to achieve an inflation target of 1%–4%, with the intention of bringing inflation down below 2½% by the end of the present parliament. This is a simple and transparent framework. Equally simple and transparent instruments will help us to achieve our objective.

Monetary policy and signalling

This brings us up to the present day. By historical comparison, the current money market and operational infrastructure in the United Kingdom is relatively uncluttered by instruments serving subsidiary objectives. Price signals now take primacy. And this freeing-up of market forces has afforded efficiency benefits: deadweight losses have been reduced.

But even in a system where a single price signal serves as the system's pivot, there is still, inevitably—as with all financial arrangements—debate about the United Kingdom's current money-market structure. Among the criticisms which have been voiced are the following:

- the system is complicated;
- the frequency of intervention is greater than is needed for the purposes of monetary policy;
- signals about monetary policy as conveyed through money-market operations are not clear;
- overnight rates are more volatile than elsewhere; and
- the range of the assets in which the Bank deals is unnecessarily limited.

Many, if not all, of these criticisms are based on a misunderstanding of the market for liquidity in the United Kingdom.

But to assess the validity of these criticisms, I need first to define some criteria for measuring money-market efficiency. I shall identify two. And although I shall use these to examine the United Kingdom's current structure, the criteria apply equally when looking forward to Stage 3 of EMU.

First, the money markets should provide an effective channel through which changes in the monetary policy stance can be signalled. Second, the money markets should ensure that the distribution of central bank liquidity within the banking system is achieved efficiently.

Consider the signalling criterion first. An oft-quoted stylised fact about the UK money market is that overnight and other short-maturity interest rates appear very volatile, relative to similar portions of the yield curve in other countries. For example, Kasman (1992) calculated that the average absolute deviation of UK overnight rates from UK official rates between 1988–91 was almost 33 basis points. This was double that in the United States (14 basis points) and Germany (16 basis points), and three and a half times that in Japan (9 basis points). A number of explanations have been put forward to explain this and I will consider some of them later.

But from a macroeconomic perspective the real issue is whether this short-rate volatility disrupts monetary policy signalling. That is, whether noise at the short end of the yield curve infects points further up the curve—points where expectations of future policy actions are crucial, and where savings and investment decisions are made.

Empirical evidence suggests that volatility is not passed up through the maturity spectrum from overnight rates. Kasman considers the transmission of *unconditional* overnight interest rate variability to three-month money-market rates in the United Kingdom, finding little evidence of significant volatility spillovers. Ayuso, Haldane and Restoy (1994) use a *conditional* (ARCH) measure of overnight rate volatility, and consider its effects up the length of the money-market yield curve. They find significant volatility transmission effects only at the three-month maturity. And even then the extent of the spillover—less than 10%—is quantitatively small. The same study finds significant volatility transmission effects for France and Spain, but not for Germany. Monetary policy signalling does not, therefore, appear to have been befogged by noise at the very shortest end of the UK yield curve.

There is a second—rather more abstract—point I would like to make about monetary policy signalling. The ability to send monetary policy signals is inextricably linked to a central bank's liquidity provision, as I discussed earlier. But the act of monetary policy signalling need not be linked to such liquidity provision. The two are separable functions. Indeed, we could easily envisage a world where policy signalling was achieved not through open-market operations, but by hoisting a flag from the top of the Bank, or by speeches by the Governor. The system would be immediately transparent to all—not just those with whom the Bank deals. It could easily be made more sophisticated. For example, probabilities could be assigned to future monetary policy outcomes as an alternative means of managing yield curve expectations. And the United Kingdom has started to move in this direction. Advice by the Bank to the Government on the appropriate level of interest rates is now published in the minutes of the monthly monetary meetings which take place between Governor and Chancellor.

The posting of bank or minimum lending rate was, in principle, also an unambiguous signal. The essential principle is that signals should be clear. Agents will always be quick to overinterpret money-market operations as signals about the future. And the best way to guard against this is to make the setting of policy objectives and the determination of the monetary stance as open and transparent a process as possible.

Money-market microstructure

The second criterion I suggested was that money-market arrangements should produce an efficient allocation of central bank liquidity. The formal structure of the Bank's operations in the money market has changed little since the turn of the century, although continuity of form may conceal changes of substance. Certainly, the notion of the Bank of England using daily operations to smooth money-market prices, and making funds available to the discount houses at a rate of its choosing, was well established prior to the Second World War.

Money-market microstructures are also relevant to the current debate about the operation of policy in EMU. I will restrict myself to three issues. First, the means by which central banks supply liquidity to the banking system. Second, the frequency with which the target requirement on banks bites and with which liquidity is injected. And third, the counterparties to these liquidity injections. This taxonomy cuts across a number of related issues—for example, reserve requirements and real-time gross settlement. Significantly, all three issues have been raised as possible explanations for the stylised fact of high overnight interest rate volatility in the United Kingdom.

Means of liquidity provision

There are a number of routes by which the issue of central bank liquidity provision might be approached. The classical dichotomy is between open-market operations on the one hand, and the discount window or standing facilities on the other. *A priori*, I think the differences between these are more apparent than real, especially when window borrowing is secured on collateral. The differences become more important if we consider central banks' occasional lender of last resort function to institutions encountering liquidity problems.

Bagehot favoured levying a bank-specific penal interest rate on the provision of lender of last resort services via the discount window. Moreover, such services were only to be extended to solvent—that is, *temporarily* illiquid—banks. More recently, Goodfriend and King (1988) have proposed that open-market operations, rather than the discount window, be used to meet lender of last resort *and* monetary policy objectives. Under their scheme, open-market operations would furnish an elastic supply of currency to head off occasional risks of systemic failure. This is fully consistent with interest rate smoothing. At the same time, short-term interest rates would be held at levels appropriate to longer-term monetary objectives. McCallum (1994) discusses these issues. But, for monetary policy purposes at least, whether a central bank holds on its balance sheet high-quality paper or advances backed by high-quality paper is more a question of semantics than economics. To some extent, the issue concerns the nature of the money market. If individual banks have access to attractive central bank facilities, they have little incentive to deal with each other. But if they cannot rely on direct access to central bank funds, private markets in liquidity are likely to develop.

UK history tends to bear this out. Both open-market operations and standing facilities have, to differing degrees, been used over time. Consistent with the increasing market orientation of operations, there has been a gradual shift toward use of open-market operations through the 1970s and 1980s, but with the discount window available as a backstop.

A number of central banks—the Bundesbank, the Banque de France and De Nederlandsche Bank among them—use a corridor system for short-term interest rates. This is a formal mix of the discount window and open-market operations. The ceiling and floor rates for the corridor are most often central bank discount window lending and deposit rates respectively; while short-term rates within the corridor are managed via periodic open-market operations. Often, official interest rates within the corridor will be market-determined, with the central bank fixing the quantity, rather than the terms, of its open-market operations.

The UK system can be seen as a special case of these arrangements. The Bank's open-market operations dictate its preferred mid-point for money-market rates, which are then allowed to fluctuate freely around this mid-point in line with agents' expectations. Since the Bank of England always stands ready to deal daily in its open-market operations, this mid-point for short-term interest rates is reinforced frequently. And this in turn prevents money-market rates in the all-important one-month to three-month maturity range—the range affecting banks' base rates—from diverging too much or for too long from official dealing rates. It is not clear that there is a need for a formal band, or corridor, for money-market rates. *De facto*, both systems serve similar functions.

My second point relates to the maturity of the instruments used to provide liquidity. Open-market operations in the United Kingdom typically specify only the maturity window—most often up to one month—within which liquidity is to be provided to the banking system. This effectively gives the banking system the discretion to choose roughly upon which point on the yield curve the Bank of England operates. And because this is a private sector decision, some short-maturity interest rates may therefore move out of the central bank's direct control. Such behaviour may help to explain deviations of the overnight rate from UK official interest rates, but does not threaten the influence of official rates on banks' base rates.

My third and final point on central bank liquidity provision concerns the stock of securities the Bank of England is willing to accept in its market operations—so-called eligible bills. This stock of bills is relatively small in relation to gross money-market flows. Moreover, in the recent past, the Bank of England owned a significant proportion of the total (the so-called 'bill mountain'). Between 85% and 95% of eligible bills were held by the four largest UK clearing banks between 1987 and 1991. This meant that the transactions media with the central bank—eligible bills—were not always held by the banks which were deficient of funds. As a result, reserves-deficient banks could find themselves forced to borrow from the central bank via a commercial bank holding eligible bills. This effectively allowed the bill-holding commercial bank to exert some control in the money market. And this in turn could generate pressures upon interest rates in the interbank market, contributing to overnight rate variability.

The Bank has addressed this by announcing, on 12 January this year, new repo and secured loan facilities intended as a lasting feature of the Bank's money-market operations. These arrangements formalised and extended the temporary facilities, put in place following sterling's withdrawal from the ERM in September 1992, to manage the very large money-market shortages created by earlier foreign exchange intervention. They follow a regular timetable, with funds being made available for fixed periods of two or four weeks once every fortnight.

The facilities complement the Bank's daily operations in the bill market, extending both the range of instruments and direct counterparties through which the Bank is willing to provide liquidity. Funds are provided through repos in gilt-edged stock and loans secured against certain types of government-guaranteed paper. Total outstanding gilt-edged stock alone is some £200 billion compared with only £19 billion in eligible bills, and holdings are much more widely dispersed, so the new facilities provide additional scope for relieving shortages without straining the bill market. Counterparties are large banks and building societies, market makers in gilt-edged securities (GEMMs) and discount houses. GEMMs' facilities are limited in line with their capital, so as to limit the extent to which the Bank disintermediates the banking system, but other counterparties can apply for any amount of funds under the facility, although the Bank reserves the right to scale back applications. The rate of interest on the facilities is fixed by the Bank in advance and is closely related to the rate at which the Bank provides funds through its daily bill operations. Thus interest rates are still, at least for the present, set through the traditional daily operations rather than through the new facilities.

We expect these measures to help counter the problems highlighted earlier. Already there seems to be some evidence of this in the behaviour of overnight rates. Since the turn of the year, the standard deviation of the difference between UK overnight and official interest rates has fallen to 0.48%, against an average of over 0.6% over the preceding five-year period, and to 0.44% over the past three months. Overnight volatility may already be waning, although it is too early to judge.

Frequency of liquidity provision

Let me turn now to discuss the frequency of money-market operations. It is well known that the Bank of England operates daily to inject liquidity into the money market. This is sometimes interpreted as indicating our desire to regulate overnight interest rates—as occurs, for example, in the United States. It is no such thing.

The need to intervene daily derives from the reserve requirement regime the United Kingdom operates. That is, a zero reserve requirement with a maintenance—or averaging—period of one day. To prevent this reserve requirement being violated by at least one bank, any aggregate reserves disequilibrium must therefore be offset

each day—hence the need for daily liquidity injections. Imposing a daily reserve requirement increases daily pressures upon liquidity. Commercial banks are given less time to 'work off', or smooth out, the effects of stochastic liquidity shocks. It has been suggested that the imposition of positive reserve requirements could usefully reduce the daily pressure, by providing banks with an artificial pool of liquidity to cushion the effects of liquidity shocks. But I feel this misses the point, for two reasons.

First, the stabilising role of reserve requirements derives from the averaging of reserve requirements, not from the level at which they are imposed. Without averaging, a reserve requirement—of whatever size—must be met each day and so cannot be drawn down to insulate against liquidity shocks.

Second, positive unremunerated reserve requirements—as is well known—are distortionary taxes upon financial intermediation. And even if reserve requirements were remunerated, it is unlikely that this would be 'full' remuneration—in the sense of leaving banks indifferent between holding required reserves and other assets. Those deadweight losses from earlier years would rise from their grave. This is the main reason why cash ratios in the United Kingdom have been progressively lowered since the Second World War, to levels which are now behaviourally unimportant. More fundamentally for our purposes, however, the distortions inherent in positive unremunerated reserve requirements are avoidable without compromising required reserves' stabilising function.

The liquidity buffer for commercial banks could equally be provided by collateralised central bank overdrafts, with a required reserve ratio of zero averaged over some period. The outcome would be stabilisation of the money market, without the inefficiencies associated with positive required reserves. To borrow some terminology from monetary theory: liquidity stabilisation can be as well—and more efficiently—achieved by central bank credit on demand, as by commercial bank cash in advance. Indeed, we already have credit on demand, in the form of lending facilities available to the discount market.

What I have been describing could be characterised as a system of averaging with zero reserve requirements. In the United Kingdom, the averaging period is one day. Elsewhere, it is longer and tends to be operated such that any reserve deficiency over the averaging period as a whole is charged at a Lombard rate, while any excess of reserves at the central bank is paid a deposit rate. Generalising, under this kind of arrangement, intra-period reserves positions—whether debit or credit—would not earn or pay interest, though daily overdrafts would be collateralised. The central bank would then be acting as a *de facto* market-maker in central bank money. It is not clear that such a system would differ markedly from existing operations. At present, the Bank is in effect a market-maker in central bank money through open-market operations and lending facilities. And there is a wider issue of whether market-making in liquidity is something which can be left to the private sector, as in other financial markets, or carried out by the central bank.

A different pressure on liquidity will emerge as we move towards real-time gross settlement systems for large-value payments. These systems will be introduced in the United Kingdom at the end of 1995. The possibility of commercial banks going overdrawn intra-day with the central bank will then arise. It might be argued that positive reserve requirements could provide the necessary buffer-stock of liquidity, enabling banks to meet their real-time payment obligations without going overdrawn at the central bank. But again, these obligations can equally be met through collateralised overdraft facilities—thereby obviating the distortions imposed by required reserves—and this is the path we will follow.

Of course historically reserve requirements have often been rationalised in quite different terms: as a mode of taxation; as a prudential safeguard; and as a means of monetary control. But as US experience, for example, has shown, none of these arguments has stood the test of time.

Counterparties to liquidity provision

Finally, I come to counterparties. There is probably more confusion about the institutional mechanics in the United Kingdom than about anything else. Central to this confusion is the role played by the discount houses.

In principle, the discount houses' role is simple: they funnel liquidity between the Bank of England and the banking system, 'smoothing out irregularities in the ebb and flow of funds among the commercial banks and others' (Radcliffe Report 1959). In practice, this role has evolved considerably through time and is smaller now than in the 1950s.

A number of structural factors have contributed to this. Among these, the growth of the interbank market since the early 1970s, and a corresponding fall in the proportion of banks' assets held with the discount houses, has been prominent. The phasing out of 'club money'—secured money required to be held with the discount houses by eligible accepting banks—from 1986 strengthened this trend. Most recently, the introduction of the new repo facilities has provided banks and building societies with direct access to central bank money. At the same time, this should relieve strains on the discount houses' balance sheets, allowing them to play a more active role in daily operations. The real issue is whether or not there is a demand for a market in liquidity. And the most important point to make about counterparties is that it is the reserve management behaviour of the larger clearing banks, rather than that of the discount houses, which has the strongest influence on money-market conditions.

Conclusions

Monetary union means harmonisation—but of interest rates and policies, not of private sector institutions and behaviour. In a single-currency area, those money-market structures which are efficient will flourish, while those which are

inefficient will wither on the vine. No-one rationally argues that the monetary unions of London and Liverpool, of Frankfurt and Freiburg, of Paris and Perpignan or of Amsterdam and Arnhem should necessarily have the same financial infrastructures. The same principle applies to Europe as a whole.

We shall all find it difficult to adapt to the implications of monetary union. It will call into question habits of mind and practices with which we have long been familiar. Change is especially difficult for central bankers. After all, we stand for stability. But sometimes change is necessary in order to achieve stability. And it will be important to the success of monetary co-operation—let alone union—in Europe that we refrain from taking entrenched positions in advance of a careful and open debate about the optimal instruments of monetary policy. That will require a degree of openness that may not come naturally to us. In that regard, I can do no better than return to Bagehot who wrote:

"The Bank directors now fear public opinion exceedingly; probably no kind of persons are so sensitive to newspaper criticism. And this is very natural. Our statesmen, it is true, are much more blamed, but they have generally served a long apprentice to sharp criticism . . . But a Bank director undergoes no similar training and hardening . . . He is not subjected to keen and public criticism, and is not taught to bear it . . . He is apt to be irritated even by objections to the principles on which he acts, and cannot bear with equanimity censure which is pointed and personal. At present I am not sure if this sensitiveness is beneficial."

As central bankers, we shall need equanimity as well as principles.

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