

The Bank's money market framework

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The Bank of England implements the policy stance of the Monetary Policy Committee through its operations in the sterling money markets. It also uses these operations to reduce the costs of disruption to the liquidity and payment services supplied by banks. In order to ensure their continued effectiveness, it was necessary to adapt the framework for these operations in response to the significant changes to financial and monetary conditions that occurred during the recent financial crisis. This article describes how central banks can use their money market operations to implement monetary policy and provide liquidity support to banks and some of the issues that can arise when undertaking operations to achieve these two objectives. The article goes on to explain the Bank's choices about its own operating framework, including how its thinking has been influenced by the lessons learned during the financial crisis.

Introduction

The Bank's operations in the sterling money markets serve its core purposes: to ensure monetary stability and to contribute to financial stability. Some of these operations are designed primarily to implement the Monetary Policy Committee's (MPC's) decisions on the stance of monetary policy. Others are designed mainly to provide a liquidity backstop for the banking system. They are brought together under the Bank's operating framework — the sterling monetary framework (SMF) — which provides a transparent set of principles governing these operations.

A central bank's operating framework consists of a number of elements, including: policies on access rights to central bank facilities; collateral policies; and an operating system. In different countries these elements are combined in different ways to give rise to a variety of operating frameworks. Moreover, operating frameworks continually evolve over time. This evolution can at times be rapid. During the recent financial crisis, central banks, including the Bank of England, adapted to the needs of exceptional circumstances. This period also emphasised the need to have an operating framework capable of both implementing monetary policy and fostering financial stability.

This article explains why the Bank is minded, in due course, to reinstate substantively those elements of the SMF that were suspended in March 2009 following the MPC's decision to embark on a programme of asset purchases (known as quantitative easing).⁽²⁾ In order to explain that decision, the

first section of this article describes the crucial role of reserves balances that banks hold at the central bank. The second section discusses how the central bank can use the terms on which it supplies these reserves to support the achievement of its monetary and financial stability objectives. The third section then describes the key characteristics of three commonly discussed systems through which the central bank supplies reserves. The fourth section discusses the implications of these three systems for the interbank money market. The final sections explain the principles underpinning the choices that the Bank has made about its own operating framework and, given those principles, how its thinking about the design of its operating framework has been influenced during the financial crisis.

The role of reserves balances

Reserves are overnight balances that banks hold in an account at the central bank. As such, they are a claim on the central bank. Together with banknotes, reserves are the most liquid, risk-free asset in the economy. And they are the ultimate asset for settling payments; banking transactions between customers of different banks are either directly or indirectly settled through transfers between reserves accounts at the central bank.

Reserves also help banks to manage their liquidity risks, which arise as a natural result of banking activities. Banks transform

⁽¹⁾ The authors would like to thank Tarkus Frost and Ben Westwood for their help in producing this article.

⁽²⁾ Quantitative easing is discussed in Benford *et al* (2009).

deposits, many of which may be withdrawn at short notice, into loans that are typically contractually committed for longer periods. This maturity mismatch exposes banks to liquidity risk — the risk that they cannot realise assets quickly enough to pay back deposits — or, if they were forced to realise assets quickly, to the risk that they could do so only at distressed prices thereby damaging their value. Banks can self-insure by holding a buffer of liquid assets that can be easily realised. As the most liquid asset of all, reserves often form a key component of such a buffer.

Factors affecting the aggregate demand for reserves

The demand for reserves can shift for a number of reasons. Over time it is likely to grow as the economy and payment flows expand. But, as recent events have shown, there can also be more abrupt changes. During stressed times, the interbank market may not work effectively and a bank that is short of reserves may find it more difficult than usual to borrow reserves from another bank in the market. Observing such difficulties, other banks may respond by increasing their desired buffers of reserves in case they are faced with unexpected future payment demands. For the banking system as a whole, this would be reflected in a greater aggregate demand for reserves.

Supply of reserves

Only central banks can alter the supply of reserves. Their operating framework defines the terms on which, and the process by which, this is normally done. It also provides central banks with a mechanism for achieving their policy objectives. The next section describes the objectives the central bank typically seeks to achieve in its operations.

Objectives of operating frameworks

The specific objectives of central banks' operating frameworks differ from one central bank to another. But typically, central bank objectives involve implementing monetary policy and supporting financial stability. The financial crisis has highlighted that the design of a central bank's operating framework plays a key role in how these two objectives can be met.

Monetary policy implementation

Central banks usually communicate the desired stance of monetary policy by setting a short-term interest rate — the 'policy rate'. Their operations in money markets are typically conducted with the objective that the interest rates at which banks transact for short periods of time are close to this policy rate. To achieve that, central banks need to keep the supply of reserves in line with changes in the banking system's aggregate demand, so that there is neither a shortage nor a surplus of reserves. Otherwise, in the event of an increase in the demand for reserves, market interest rates would tend to rise relative to the policy rate as banks bid rates up in their efforts to secure

scarce reserves. The opposite would occur following a fall in the demand for reserves.

Provision of liquidity insurance

Central banks' responsibilities with respect to financial stability mean that they usually provide some degree of liquidity insurance to individual banks and to the banking system as a whole. An adverse liquidity shock could impair banks' ability to provide payment services to their customers or to undertake new lending. Central banks can mitigate the impact of liquidity shocks to individual banks by offering to lend reserves bilaterally. And they can mitigate the effects of liquidity shocks to the banking system by allowing the aggregate supply of reserves to increase and/or by easing the terms at which reserves are supplied.

A key challenge for central banks is that, although they can observe changes in banks' demand for reserves, they are usually not able to identify with certainty why demand has changed. For example, the central bank rarely knows whether an increase in demand for reserves reflects a temporary liquidity problem or a more fundamental problem that casts doubt on the solvency and viability of the borrowing bank. More generally, the availability of liquidity insurance could induce risky behaviour, with adverse consequences for future financial stability. This 'moral hazard' is discussed further in the box on page 294.

Other objectives

Central banks can effectively fulfil their objectives only if their own creditworthiness is unquestioned. So central banks place considerable weight on ensuring that their financial operations with banks do not endanger their own solvency. For this reason most central banks choose to transact on conservative terms. This means that they would usually prefer to lend reserves secured against only high-quality collateral that they could sell if the borrowing bank were to default. And, to ensure that the collateral would be sufficient to cover the loan under most circumstances, they would usually lend less than 100% of the value of the collateral — ie impose a 'haircut'.

Central banks are likely to consider other criteria when designing their operating framework. For example, central banks generally prefer frameworks that are operationally simple and transparent. And they favour frameworks that promote competitive and fair money markets to facilitate the efficient provision of payment services to the wider economy.

Interactions between monetary policy and financial stability objectives

A central bank's operational monetary policy objective is usually unambiguous: the closer market interest rates are to the policy rate, the more reliably monetary policy is implemented. And the more the supply of reserves adjusts automatically to accommodate changes in demand, the better

Liquidity insurance and moral hazard

Central banks typically provide liquidity insurance to the banking system. When designing their liquidity insurance facilities, central banks — like any insurance provider — have concerns over ‘moral hazard’.

Moral hazard in this context refers to the risk that the availability of liquidity insurance induces banks to take on more risk than they otherwise would. A simple incentive arises because liquid assets such as reserves yield less than illiquid long-term loans and hence self-insurance is costly.

Given that central banks can create reserves at effectively zero cost to themselves, it could be argued that it does not matter if banks take on more liquidity risk. That line of reasoning fails to take account, however, of the intimate relationship between banks’ liquidity risk and their solvency. For example, one way that an insured bank could increase its liquidity risk would be by making longer-term loans than it otherwise would. But that would probably also increase its solvency risk, given that pay-offs from its loan book would become more uncertain.

Central banks have a number of options for limiting this moral hazard. One response that all central banks seek to implement is to lend only to institutions that it judges to be solvent. In principle, this threat of not being able to access central banks’ liquidity facilities should reduce the liquidity risk (and the associated solvency risk) banks are willing to shoulder.

this objective will be met. By contrast, there is an inherent tension in how a central bank’s financial stability objective can best be met. The more the supply of reserves adjusts automatically to accommodate changes in demand, the more seamlessly liquidity insurance is provided. But this makes it more likely, other things being equal, that the banking sector will pursue riskier activities to the detriment of future financial stability. In other words, fully accommodating changes in the demand for reserves is often the best way to implement monetary policy but not necessarily best, in the long run, for financial stability. In principle, there could thus be a tension between the central bank’s monetary policy and financial stability objectives that needs to be managed.

There are a number of complementary tools that can help manage this potential tension. In particular, the regulatory framework limits the risks individual banks take. But the design of central banks’ operating frameworks will also have an influence. Before describing how the Bank pursues its objectives through the design of its operating framework, it is important to understand the key characteristics of different approaches. The next section sets out three alternative

It can, however, be difficult to distinguish between liquidity and solvency problems in practice. So central banks also make liquidity insurance costly to access. In principle, they can do this by charging higher interest rates for high usage of liquidity facilities or for accepting lower-quality collateral.

Alternatively, they can increase the size of the haircuts on collateral imposed beyond those that would be strictly necessary to guard against credit risk.

Central banks are unlikely to have sufficient information to manage moral hazard effectively through haircuts alone. They can set haircuts based on an analysis of the characteristics of the assets pledged as collateral (for example, an assessment of how the value of an asset might change in different scenarios) to help manage credit risk.⁽¹⁾ But setting haircuts to manage moral hazard would also require an analysis of the balance sheet and possible future behaviour of the bank pledging the asset.

Charging a premium over the policy rate for high usage of liquidity facilities or for lending against lower-quality collateral is likely to be a more effective way to reduce moral hazard. However, to the extent that, in some conditions, these interest rates could influence market interest rates, the central bank may induce unwanted changes in the monetary policy stance. The liquidity insurance framework therefore needs to be carefully designed and implemented to strike the appropriate balance between these different considerations.

(1) See Breeden and Whisker (2010) for a description of collateral risk management at the Bank.

operating systems, each of which would enable the central bank to supply reserves so as to keep market interest rates close to the policy rate.

Alternative operating systems

Most central banks alter the supply of reserves through market transactions known as open market operations (OMOs) and/or standing facilities.

- OMOs are designed as multilateral transactions in which the central bank, at its own initiative, deals in the market, affecting the banking system as a whole. If it buys assets or makes loans, it puts reserves into the banks’ accounts held at the central bank. If it sells assets or borrows in the market, these transactions are settled by reducing the banks’ reserves accounts.
- Standing facilities are designed to facilitate bilateral transactions in which a bank at its own initiative deals with the central bank. Lending facilities allow banks to borrow reserves directly from the central bank, potentially in very

large amounts. Deposit facilities allow banks to deposit reserves in interest-bearing accounts at the central bank.

Central banks also need to specify the circumstances in which banks can access the facilities that they offer and the range of eligible collateral, and associated haircuts, that can be pledged with the central bank in return for borrowed reserves.

In principle many different operating systems could be constructed from the basic elements, but they can broadly be grouped into three types. A number of central banks in countries with developed financial systems have adopted variants of the so-called 'corridor system'. More recently some have adopted what has become known as a 'floor system'. And, finally, there is the so-called 'zero-corridor' system that has been proposed as a simpler alternative.⁽¹⁾

The choices of operating system, access rules and collateral policies *jointly* determine how monetary policy is implemented and how liquidity insurance is provided, as well as how any potential tensions between those activities are managed. The remainder of this section describes in generic terms how these three operating systems can be used to implement monetary policy, and the particular challenges associated with their use.

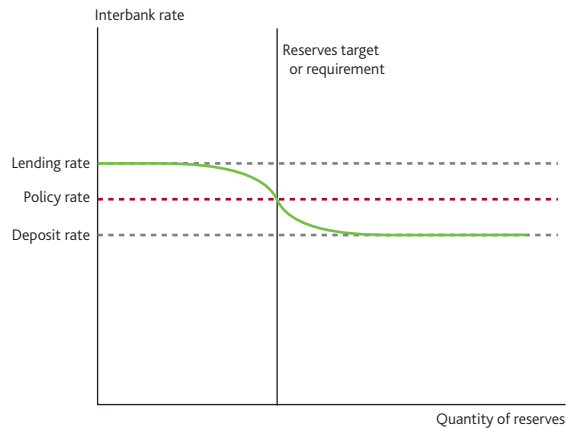
A corridor system

The corridor system derives its name from the interest rates on the central bank's standing facilities. The lending rate will be above, and the deposit rate will be below, the policy rate, forming a corridor around it. As discussed in the box on page 296, the specific design of the corridor system — in particular, whether banks are required to hold reserves or do so voluntarily — differs from central bank to central bank.

Banks will typically be unwilling to deal in the market on worse terms than those available at the central bank. Consequently, the short-term market rate is unlikely to fall below the central bank's deposit facility rate or to rise above the lending facility rate, thus helping to keep market rates close to the policy rate. But the presence of an interest rate floor from the deposit facility and a ceiling from the lending facility also influences market rates within the corridor. Banks are generally uncertain about the impact that their customers' future payment flows will have on their reserves position. On the one hand, if they think they are likely to be short of reserves, then they will be willing to pay more in the market to reduce the risk of having to use the lending facility at a penal rate. On the other hand, market rates will be relatively low if banks think they face holding excess reserves and receiving a lower return in the deposit facility. The resulting demand for reserves is illustrated in the green line in **Chart 1**.⁽²⁾

To implement monetary policy the central bank has to forecast the amount of reserves it needs to supply to meet banks'

Chart 1 Stylised demand for reserves in the corridor system^(a)



(a) The shape of the demand curve will differ depending on the specification of the corridor system. This is discussed further in the box on page 296.

aggregate demand at the point where the market rate and policy rate coincide.⁽³⁾ Consequently, the central bank's task is easier in corridor systems where banks' demand for reserves is determined through mandated reserve requirements or reflected in formal targets, than in corridor systems with no specified targets. Inaccurate forecasts by the central bank and/or changes in the demand for reserves that leave banks with insufficient or surplus reserves will tend to lead to deviations of market rates from the policy rate. Whether or not such deviations have a material impact on the stance of monetary policy will depend on the amplitude and persistence of shocks, as well as the precise design of the system. The box on page 296 explains how corridor systems can be designed to minimise such deviations.

Under the corridor system, the central bank adjusts the aggregate amount of reserves by undertaking OMOs. The on-demand standing facilities then help to keep market interest rates close to the policy rate.

The corridor system relies on a functioning interbank money market to distribute reserves across the banking system. This poses a challenge if — as during the recent financial crisis — banks become reluctant to lend to each other. To provide liquidity insurance in the face of such a shock, while maintaining interest rate control, the central bank could try to bypass the interbank money market. It could do this by offering both to supply and to absorb a large amount of reserves in its OMOs. Narrowing the width of its interest rate corridor would have a similar effect, as it would lower banks' costs of dealing directly with the central bank relative to dealing in the interbank money market.

(1) See, for example, Buiters (2008) and Wiseman (2007).

(2) See, for example, Keister *et al* (2008) for a more detailed description.

(3) In so doing, the central bank must also account for other factors that affect the supply of reserves, such as changes in the public's demand for banknotes.

Interest rate corridors

Interest rate corridors consist of a rate at which the central bank will lend reserves to commercial banks and a rate at which it will take deposits from them. Any such system will help to prevent rates in the interbank market from straying outside the corridor. How market rates are determined within the corridor depends on factors such as whether or not banks are required to hold reserves, and whether and how reserves are remunerated. The combination of the corridor with these other factors gives rise to a variety of different corridor systems, examples of which are discussed further in this box.

In some systems, including in the euro area, banks are each required to hold a certain quantity of reserves. In the United Kingdom, prior to the MPC's decision to purchase assets financed by reserves creation, banks were invited to set their own explicit reserves target each month. In both cases, the central bank's task in implementing monetary policy is to supply a quantity of reserves in line with the requirements or target, so that the market rate lies at the centre of the corridor with no tendency to move towards one or other edge.

If banks are required to meet their reserves requirements or targets precisely, market interest rates will be very sensitive to variations in the supply of reserves around those requirements or targets. That is because small variations in supply can move banks from using the lending facility into using the deposit facility or *vice versa*. In that case, the demand curve in **Chart 1** would be steep in this area. But if requirements or targets do not have to be met so precisely, market rates should be less sensitive. For example, in the United Kingdom, banks suffered

no penalties so long as their reserves were, on average over the month, within a certain range around their targets. Consequently, within the target range, the demand curve in **Chart 1** was relatively flat.

Both the tolerance and the averaging process contribute to the objective. If banks can vary their reserves holdings from day to day, that reduces the probability that they will have to use central bank facilities to borrow or deposit at rates at the top or bottom of the corridor. That in turn helps to stabilise market interest rates. The central bank's task is also made easier in that it needs to forecast and supply the necessary quantity of reserves only on average over the period. And it has the opportunity to adjust supply during the period.

Other corridor systems are rather different. In Australia and Canada, for example, there are no reserves requirements or formal targets. All reserves are remunerated at the rate at the bottom of the corridor (below the policy rate and below market rates). Banks therefore, in practice, target quite low levels of reserves. Their demand depends mainly on a comparison of the benefits from holding some reserves for use in the payment system against the cost of their low remuneration rate. The central bank's task is to supply its estimate of the small amount of reserves that will enable the market to clear at the target rate. With the demand for reserves less easy to observe in such systems, central banks are more reliant on information from movements in the market rate itself. And with only a low level of reserves available to buffer liquidity shocks from day to day, the central bank needs to regularly adjust the supply of reserves — possibly almost every day as, for example, in Australia — in order to avoid volatility in market interest rates.

A floor system

The 'floor system' can be thought of as a variant of the corridor system where backstop liquidity insurance is still provided at a penal rate, but where the deposit rate that provides a floor to interbank money market rates has been raised to the level of the policy rate.

Under the floor system, the central bank deliberately supplies reserves in excess of the level banks would voluntarily target. In aggregate, the banking system has to hold all the reserves the central bank creates. Individual banks might try to lend their surplus reserves to other banks, but would not do so at a lower interest rate than could be obtained at the central bank. In this way, the floor system drives market interest rates down to, but not below, the policy rate. It has obvious attractions if a central bank wishes to inject additional money into the system without losing control of its target interest rate.

The floor system negates the need to regularly forecast the demand for reserves accurately since reserves are oversupplied

with an interest rate floor at the policy rate. With the banking system oversupplied with reserves, it also relies less on the interbank market to distribute them through the banking system.

Oversupply of reserves may, however, create its own challenges as banks find themselves with a higher ratio of liquid to total assets than they would choose. Whether and how banks respond to this disequilibrium in their balance sheet will depend on a number of factors and may not be easily predictable in advance. If the additional liquidity allows banks to extend profitable loans, then they might return towards their desired ratio by increasing lending. A floor system thus has the potential to impact on monetary conditions in ways that extend beyond influencing short-term market rates.

A zero-corridor system

The 'zero-corridor' system can be thought of as a further variant of the corridor system where both the lending and

deposit rates are the same as the policy rate so that the whole interest rate corridor is collapsed to the policy rate.

Since no bank would transact at a less favourable interest rate in the interbank market than it could obtain at the central bank, overnight interbank interest rates — to the extent that interbank trading would still take place under such a system — would thus converge to the policy rate.

Under this system OMOs are not required. Instead, the standing facilities play the central role in supplying and absorbing reserves at the policy rate. With the supply of reserves seamlessly adjusting to demand, the zero-corridor system should provide the most robust interest rate control in the face of changes to the demand for reserves or disruption to the interbank money market. However, with the banking system relying more heavily on transacting with the central bank than it does under the corridor or floor system, the zero-corridor system is also more susceptible to shortages of eligible collateral, which would impinge on the reliable implementation of monetary policy.

A drawback of the zero-corridor system is that it conflates monetary policy implementation and the provision of liquidity insurance. In the corridor and floor systems, usage of the lending facility is exceptional; in the zero-corridor system, by contrast, it is the norm. The lending facility is therefore delivering two objectives, making it harder for the central bank to distinguish between banks that are using it to manage their day-to-day liquidity buffers and those that have experienced a more fundamental liquidity or even solvency shock.

As with the two other systems, the zero-corridor system can be operated in a manner that protects the integrity of the central bank's balance sheet by appropriate restrictions on collateral and the setting of haircuts. However, a distinctive feature of a zero-corridor system is that, by regularly offering to borrow and lend overnight on demand, the central bank relinquishes day-to-day control over the size (and potentially the composition) of its balance sheet.

Impact on the interbank money market

The interbank money market is the market in which banks borrow and lend short-term funds between each other. Since these transactions have ultimately to be settled via banks' reserves accounts, the interbank money market is also the market for reserves. It follows that banks' incentives to trade in the interbank market are affected by the terms on which reserves are available from the central bank.

Of the three operating systems described above, it is the corridor system that provides the strongest incentive to trade in the interbank market. If payment flows leave one bank with a surplus of reserves and another with a shortage of reserves,

they have an incentive to trade with each other at a rate within the corridor. If, instead, they were to make use of the central bank's standing facilities, the bank that is short of reserves would have to pay the less favourable central bank lending rate (at the top of the corridor), while the bank with a surplus would receive only the central bank deposit rate (at the bottom of the corridor). There is less incentive to trade in a floor system, where banks generally have a much larger buffer of reserves with which to absorb payment shocks. And the zero-corridor system provides little or no incentive to trade in the interbank market, since banks can borrow (on security) any amount from the central bank at the policy rate and can deposit any amount at the same rate.⁽¹⁾

The interbank market forms the centre of a wider money market in which non-bank financial institutions and some non-financial companies participate. Without a liquid overnight interbank market and transparent pricing, there is a risk that this wider market would not function efficiently.

The next section briefly describes the operating framework the Bank employed prior to the financial crisis, and discusses how the lessons learned during the past three years have influenced its plans for the future development of the SMF.

The sterling monetary framework since 2006

The Bank reformed its operational framework in May 2006 to improve its implementation of monetary policy.⁽²⁾ The new framework was comprised of a corridor system in which banks set their own reserves targets every month. Reserves balances that on average over the month fell within a relatively narrow range around those targets were remunerated at Bank Rate. Outside this range, surplus reserves, which had been moved to the deposit facility, were remunerated at the lower deposit rate, while banks with insufficient reserves had to borrow those reserves at the higher lending rate to avoid a penalty.

The objective of the reforms was to ensure that monetary policy would be implemented reliably, ie there would be a close and stable relationship between overnight market rates and Bank Rate. It was designed also to offer a flexible structure for banking system liquidity management and to foster a competitive and fair money market. But it involved only limited liquidity insurance, provided in the course of implementing monetary policy. In particular, the Bank only lent against a narrow range of high-quality, liquid, collateral.

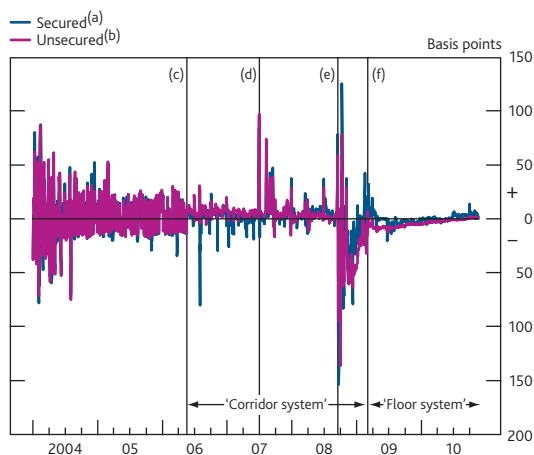
Prior to the onset of the financial crisis in mid-2007, the reserves averaging corridor system met its monetary policy

(1) Under the zero-corridor system, the incentives to trade in the interbank market would depend on the collateral policies of the central bank. If the central bank only lends against a narrow range of collateral at the policy rate, banks may have an incentive to trade with each other using other types of collateral.

(2) For a detailed description of the SMF, see Bank of England (2008a,b), Clews (2005) and Tucker (2004).

objective effectively. Short-term money market interest rates, such as secured and unsecured overnight interest rates, were generally close to Bank Rate and less volatile than under the Bank's previous operational framework (Chart 2).

Chart 2 Spread to Bank Rate of sterling overnight interest rates



Sources: BrokerTec, Wholesale Markets Brokers' Association and Bank calculations.

- (a) Spread of weighted average secured overnight rate to Bank Rate.
 (b) Spread of weighted average unsecured overnight rate to Bank Rate.
 (c) Introduction of reserves averaging corridor system.
 (d) Start of financial crisis.
 (e) Failure of Lehman Brothers.
 (f) Start of quantitative easing.

From the summer of 2007, however, when interbank markets began to seize up amid concerns about banks' solvency and liquidity, the Bank, along with many other central banks, had to adapt its operations to provide large-scale liquidity support to the banking system. Over that period, there was a greater divergence between short-term market interest rates and Bank Rate than had previously been the case.⁽¹⁾

Subsequently, the SMF underwent a further major change when the Bank suspended the corridor system of voluntary reserves in March 2009, following the MPC's decision to purchase assets financed through the creation of central bank reserves (commonly known as 'quantitative easing'). In principle, banks could have continued to set monthly targets and — to the extent that the MPC's asset purchases supplied reserves in excess of these targets — the Bank could have borrowed them back through OMOs. The Bank judged it better not to borrow reserves in increasingly large quantities at the same time as the purchase programme grew. Instead, monetary policy has since been implemented through a floor system, with the level of reserves initially being increased exactly in line with asset purchases.⁽²⁾ Over this period, overnight market rates have been close to Bank Rate (Chart 2).

The experience of the financial crisis has influenced the Bank's thinking about the operation of the SMF in a number of ways. In particular, the Bank found that it could better achieve its two main objectives if it could more clearly separate

operations aimed at implementing monetary policy decisions from those aimed at providing liquidity insurance. The crisis also highlighted that lending facilities can become ineffective if banks are unwilling to use them for fear of the reputational damage that might occur. As a result, the Bank now sees merit in having a framework that allows it to supply reserves to the banking system through a variety of channels. This provides greater robustness to unexpected events. Finally, the Bank found that, during times of great uncertainty, the information it gained about banks' liquidity through its money market operations became particularly valuable.

The remainder of this section describes in more detail how these lessons have influenced the development of the SMF.

Separation between objectives

The Bank's collateral policy plays an important role in the separation between monetary policy implementation and the provision of liquidity insurance. Operations aimed at implementing monetary policy decisions only provide reserves against a narrow range of high-quality collateral that is reliably liquid in private markets (predominantly debt securities of highly rated governments). Such operations are unlikely to alter the risk characteristics of banks' balance sheets to such a degree as to prompt any behavioural changes. By contrast, the Bank stands ready to provide liquidity insurance against a broader range of less liquid assets, such as asset-backed securities. When providing such liquidity insurance, the Bank charges higher fees to provide incentives for banks to manage their liquidity prudently.

Reflecting this separation between monetary policy implementation and the provision of liquidity insurance, the Bank split its single bilateral lending facility into two separate facilities in 2008. The first, aimed predominantly at monetary policy implementation, is the Operational Lending Facility. In this facility, banks may borrow reserves overnight on demand against a narrow range of collateral at a spread of 25 basis points over Bank Rate. Its use is limited to situations where banks suffer frictional, temporary, payment difficulties (say because of a temporary problem with the payments infrastructure) or where overnight market rates have become unexpectedly volatile.

The second facility, aimed more exclusively at liquidity insurance, is the Discount Window Facility (DWF). In the DWF, banks can borrow gilts against a wide range of collateral and for a longer period. But they have to pay higher fees that reflect the type of collateral and the size of the drawing relative to the size of the borrowing bank. Borrowers can then use the gilts in the secured money market to obtain reserves.

(1) See Cross, Fisher and Weeken (2010) for a more detailed description of how the SMF evolved during the crisis.

(2) The Bank accompanied the change with an announcement that all reserves would be remunerated at Bank Rate. Consequently, while the lending and deposit facilities remained in place, they had little or no influence on market rates.

Gilts are supplied rather than reserves, to ensure that liquidity supplied for a longer term than overnight and at the borrowing bank's initiative (but subject to the Bank's approval) does not affect the liquidity of the banking system as a whole. The DWF thus provides an operational separation between the provision of liquidity insurance and monetary policy implementation. The Bank aims to exclude from its facilities any bank whose solvency or viability is seriously in question. These design features of the DWF should help mitigate moral hazard and also reduce any stigma that has in the past been associated with the use of the Operational Lending Facility.

The Bank also stands ready to operate two different types of OMOs to supply reserves. In its short-term OMOs, it offers to lend reserves for a period of one week or less against a narrow range of collateral.⁽¹⁾ Short-term OMOs are aimed to steer the quantity of reserves to the amount necessary for the banking system in aggregate to meet its targets and to ensure that market rates remain close to Bank Rate. In contrast, since December 2007, long-term OMOs have been intended to provide some liquidity insurance. In these operations the Bank offers to lend reserves for a longer period, including against a broader range of collateral than it accepts in its short-term OMOs. But unlike with the DWF the quantity of liquidity supplied is entirely controlled by the Bank.

Of course, the distinction between monetary policy implementation and liquidity insurance is not categorical: long-term OMOs create reserves and so contain an element of monetary policy implementation, while the combination of reserves accounts and the Operational Lending Facility provides some degree of liquidity insurance. Nevertheless, the current arrangements serve to delineate the aims of the different operations more than has been the case in the past.

Robustness

In principle, the Bank could provide liquidity insurance solely via on-demand liquidity facilities like the DWF. But the Bank believes that there would be two main risks with relying solely on a single facility. First, during times of severe stress, there may be heavy operational demands on the Bank were it to use the DWF alone to supply a large amount of liquidity. Second, stigma provides an opposing risk. By their very nature, liquidity facilities, such as the DWF, are for use in exceptional circumstances and are most likely to be used by banks that need a large amount of liquidity that they would find difficult to obtain in the private markets. While the DWF is designed to limit any stigma associated with its use, it may not do so completely.

The Bank's long-term repo operations provide it with an alternative means of providing liquidity insurance. By offering to transact with the banking system as a whole on the initiative of the Bank, they are qualitatively different than facilities in which individual banks have to approach the Bank. They also

allow the Bank to supply a large amount of liquidity insurance to the banking system in an operationally simple manner.

Information

In 2006, the combination of voluntary reserves targets and the remuneration, at Bank Rate, of reserves balances that were in line with those targets, was a departure from the mandatory reserves requirements specified in many corridor systems. By inviting banks to reveal their demand for reserves every month, the Bank gained useful information about banks' liquidity needs. Under the current floor system this information is lost.

More recently, the Bank has further reformed its long-term OMOs. It continues to offer to supply reserves against both a narrow and a wider range of collateral. However, whereas from December 2007 the premium banks paid to obtain reserves against wider collateral relative to narrow collateral was initially fixed, since June 2010 it has been variable. And the amount of reserves supplied against each collateral range now depends on the level of the premium. During times of heightened stress, banks will be willing to pay a higher premium for obtaining reserves against the broader range of collateral that is less liquid in private markets. The amount of insurance provided is thus dependent on the value that banks place on this insurance.⁽²⁾ Moreover, through their bidding behaviour, banks will reveal the value they place on this insurance, thereby providing the Bank with useful information about emerging liquidity stresses in the banking system.

The SMF in the future

The Bank will retain many of the innovations and new facilities it introduced during the financial crisis. In particular, the DWF and the reformed long-term OMOs, together with the associated collateral and access policies, now form an integral part of the SMF.

The Bank is also minded, in due course, to reinstate its version of the corridor system in which banks set voluntary reserves targets. Overall, the Bank judges that — during normal times — a corridor system in conjunction with the Bank's collateral and access policies will facilitate the reliable implementation of monetary policy, while also providing appropriately limited liquidity insurance. It avoids the risk that could be associated with the oversupply of reserves under a permanent floor system and facilitates some separation between monetary policy implementation and the provision of liquidity insurance. Moreover, the Bank sees it as an advantage of the corridor system that it allows the interbank market to continue in being.⁽³⁾

(1) With the Bank's version of the corridor system suspended, the Bank currently does not operate short-term OMOs.

(2) The Bank's new long-term repo operations are described in more detail on pages 90–91 of the 2010 Q2 *Quarterly Bulletin*.

(3) The interbank market provides banks with greater flexibility in managing their liquidity, although, there can be instances where excessive interbank trading acts as a source of instability.

In extreme circumstances, the Bank stands ready to make further adjustments to its operating framework, to best meet its objectives at the time. The floor system currently in operation is an example of such an adaptation.

Conclusions

The design of an operating framework has implications for how the central bank discharges its objectives with respect to monetary policy implementation and financial stability. The former rests on meeting the banking system's demand for reserves, while the latter requires managing the provision of liquidity insurance to mitigate moral hazard.

The choice of operating system, access rules and collateral policies that constitute a central bank's operating framework will jointly determine how monetary policy is implemented

and liquidity insurance is provided and how any potential tensions between them are managed.

The experience of the financial crisis has influenced the Bank's thinking about the design of its operating framework. As a result, the Bank has adopted an operating framework that more clearly separates monetary policy implementation and the provision of liquidity insurance, that allows it to supply reserves through a variety of channels and that, through its operations, provides the Bank with information about the liquidity needs of the banking system. For the reasons outlined above, the Bank is minded, in due course, to reinstate its version of the corridor system that was suspended in March 2009. But central banks' operating frameworks are not static and the Bank's operating framework will continue to evolve in light of experience and developments in financial markets.

References

Bank of England (2008a), *The Framework for the Bank of England's Operations in the Sterling Money Markets*, available at www.bankofengland.co.uk/markets/money/publications/redbookjan08.pdf.

Bank of England (2008b), *The development of the Bank of England's market operations — a consultative paper by the Bank of England*, available at www.bankofengland.co.uk/markets/money/publications/condococt08.pdf.

Benford, J, Berry, S, Nikolov, K, Robson, M and Young, C (2009), 'Quantitative easing', *Bank of England Quarterly Bulletin*, Vol. 49, No. 2, pages 90–100.

Breeden, S and Whisker, R (2010), 'Collateral risk management at the Bank of England', *Bank of England Quarterly Bulletin*, Vol. 50, No. 2, pages 94–103.

Buiter, W (2008), 'How the Bank of England and the Monetary Policy Committee manage liquidity? Operational and constitutional issues', available at <http://blogs.ft.com/maverecon/2008/03/how-do-the-bank-of-england-and-the-monetary-policy-committee-manage-liquidity-operational-and-constitutional-issues/>.

Clews, R (2005), 'Implementing monetary policy: reforms to the Bank of England's operations in the money market', *Bank of England Quarterly Bulletin*, Summer, pages 211–20.

Cross, M, Fisher, P and Weeken, O (2010), 'The Bank's balance sheet during the crisis', *Bank of England Quarterly Bulletin*, Vol. 50, No. 1, pages 34–42.

Keister, T, Martin, A and McAndrews, J (2008), 'Divorcing money from monetary policy', *Federal Reserve Bank of New York Economic Policy Review*, September, pages 41–56.

Tucker, P M W (2004), 'Managing the central bank's balance sheet: where monetary policy meets financial stability', available at www.bankofengland.co.uk/publications/speeches/2004/speech225.pdf.

Wiseman, J (2007), 'The pretend market for money', *Central Banking*, Vol. 18, No. 1, pages 27–36.