

# Recent developments in the sterling overnight money market

By Christopher Jackson and Mathew Sim of the Bank's Sterling Markets Division.<sup>(1)</sup>

- The sterling overnight money market plays an important role in the implementation of monetary policy. This article examines developments in this market since the peak of the financial crisis.
- Developments over this period include a fall in unsecured turnover and increasing use of secured transactions in overnight money markets. These trends have been driven by a number of factors, including perceptions of bank credit and liquidity risk, developments in the Bank's operational framework, liquidity regulation and changes to banks' business models.
- Some of these developments could be expected to unwind as the Bank withdraws its unconventional monetary policy measures in due course. But other factors, such as the impact of new international liquidity regulation, are likely to persist in the longer term.

## Overview

The sterling overnight money market plays a key role in the implementation of monetary policy. It is the market through which the Monetary Policy Committee seeks to influence short-term market interest rates by setting its policy rate, Bank Rate. Changes in overnight interest rates and market participants' expectations of future rates influence longer-term interest rates and other asset prices in the wider economy. The functioning of this market is therefore important for the effective transmission of monetary policy.

### Operational developments since the financial crisis

Since the start of the financial crisis in 2007, the Bank has significantly increased the supply of liquidity to the banking system. The Bank initially accommodated this within its 'reserves averaging' framework. But in March 2009, when the Bank began its 'quantitative easing' programme — the purchasing of assets financed by the issuance of central bank reserves — it introduced a 'floor' system whereby it remunerated all central bank reserves at Bank Rate. This provided a floor to overnight interbank interest rates as no bank with a reserves account should have the incentive to lend reserves at a rate below Bank Rate.

### Structural developments in the market

Activity in the sterling overnight money market has changed since the start of the financial crisis, as a result of both the crisis itself and policymakers' responses to it.

The financial crisis increased market participants' awareness of bank credit risk and of their own liquidity risk. During the height of the crisis, banks increasingly transacted with the Bank rather than the money market to manage their liquidity. The introduction of the floor system and the significant increase in reserves further reduced banks' need to use the money market for liquidity management. As a result, money market activity, particularly in the unsecured interbank market, fell. At the same time, heightened sensitivity to credit risk, and international liquidity regulations, have encouraged banks to trade on a secured rather than an unsecured basis. Changes in banks' business models have also altered incentives to arbitrage differences between market rates and Bank Rate.

Some of these changes may be temporary and unwind with the eventual withdrawal of unconventional monetary policy measures. But other changes, such as international liquidity regulations, are likely to have a longer-term effect on the structure of the market.

### Summary table Key developments in sterling overnight markets

- An increased awareness of bank credit risk and liquidity risk.
- Introduction of the 'floor' system and an increase in the supply of reserves.
- Reduced volatility in overnight interest rates since the introduction of the 'floor' system.
- A decline in unsecured money market activity and growth of the secured market.
- Introduction of international prudential liquidity regulations.
- Changing incentives to arbitrage overnight interest rates.

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The sterling money market is the market for short-term borrowing and lending of cash among banks and other institutions. While the maturities of these transactions can extend to one year, this article focuses on the shortest maturity of transactions, those in the overnight money market.

This article describes how the sterling money market has developed since the height of the financial crisis.<sup>(1)</sup> The first section outlines developments in the Bank's operations and the overnight money market in response to the financial crisis. The article then goes on to discuss how the financial crisis — and policymakers' responses to it — have affected the structure and functioning of the overnight market in the longer term. The box on page 231 provides a comparison with developments in international money markets.

## Overview of the market

The sterling overnight money market plays an important role in the transmission of monetary policy. The Bank operates in the sterling money market to implement the interest rate decisions of the Monetary Policy Committee (MPC). It does so by seeking to maintain overnight market interest rates in line with the MPC's policy rate (Bank Rate) between MPC meetings, with little day-to-day or intraday volatility. In doing so, it seeks to establish the benchmark short-term risk-free rate on which other interest rates pertinent to the real economy are based. Changes in overnight interest rates and changes in market participants' expectations of their future values affect longer-term interest rates. These in turn influence the cost of credit and prices of assets in the wider economy. The Bank's operations in the sterling money markets are set out in its Sterling Monetary Framework (SMF).<sup>(2)</sup> The box on page 225 provides an overview of data sources that the Bank uses to monitor the overnight money market.

The overnight money market can be divided into two parts: the market for unsecured deposits or loans, and the market for repurchase, or 'repo', transactions. Unsecured lending consists of transactions that are not collateralised.<sup>(3)</sup> A repo, by contrast, is the lending of cash secured against collateral, typically UK government debt. In a repo transaction, a borrower agrees to sell a security and repurchase it at a specified date in the future. The lender holds the security as collateral, or insurance, in the event of default.

A range of institutions participate in the overnight money market. Banks typically use it to manage their daily liquidity needs and source their short-term funding. Non-bank financial institutions (such as money market funds, pension funds and insurers) and non-financials (such as non-financial corporates and local authorities) also operate in the overnight

money market. These institutions primarily seek to lend their cash holdings to banks, and do so in the short-term money market to limit their exposure to credit and liquidity risk. The UK Government's Debt Management Office (DMO) also lends and borrows at a range of maturities.

## Operational developments in response to the financial crisis

The Bank currently influences overnight market interest rates through the rate it pays on central bank reserves, Bank Rate. These reserves are deposits that commercial banks hold at the Bank. In 2006, the Bank introduced a system of 'reserves averaging'. Under this system, banks' reserves balances were remunerated at Bank Rate provided their reserves were, on average, within a certain range of their voluntary targets. The box on page 227 provides a fuller overview of the reserves averaging framework.

Between 2006 and 2007, this system maintained overnight interest rates within a relatively small range around Bank Rate. During 2007–08, however, the sterling interbank money market experienced stress due to market participants' concerns about other banks' solvency and their own liquidity positions. The volatility of overnight rates increased as banks became unwilling to lend reserves to other banks. Market participants no longer perceived unsecured overnight lending to a bank as being near risk-free. In addition, banks became uncertain about the possibility of future shocks to their own reserves balances. These factors became particularly acute after the bankruptcy of Lehman Brothers in September 2008.

The Bank responded to the stress in the money market by increasing the supply of reserves to the banking system (**Chart 1**). The increase in the supply of reserves in 2007–08 largely reflected changes to the banks' own voluntary reserves targets, which nearly tripled from £16 billion in July 2007 to £45 billion in December 2008, as their precautionary demand for reserves grew. The Bank injected considerably more reserves than this into the banking system in gross terms, but it typically offset much of these increases with its open market operations to 'drain' reserves in excess of banks' targets.<sup>(4)</sup> The Bank also significantly widened the range around reserves targets within which reserves were remunerated so that banks could, in aggregate, hold these additional reserves without being penalised for exceeding their targets. Overnight interest rates during this period, however, remained volatile compared with the pre-crisis period (**Chart 2**).

(1) For an overview of the history of the wider sterling money market and some of the other themes discussed in this article, see Hauser (2013).

(2) See Bank of England (2013a).

(3) The unsecured money market also contains certificates of deposit and commercial paper. These instruments tend to be of a maturity greater than overnight. Therefore this article focuses on deposits in the unsecured market.

(4) See Cross, Fisher and Weeken (2010).

## Monitoring the overnight money market

There is no single comprehensive measure of interest rates and activity in the overnight money market. As a result, the Bank monitors a range of information.

The timeliest measures of overnight interest rates come from brokered transactions, in which a broker acts as an intermediary between borrower and lender. Interest rates in the brokered unsecured market are represented by the sterling overnight index average (SONIA), which is the daily weighted average interest rate of unsecured overnight transactions brokered by members of the Wholesale Markets Brokers' Association (WMBBA). In the brokered secured market, interest rates are represented by the repurchase overnight index average (RONIA), the daily weighted average interest rate of transactions secured against UK government debt, also brokered by WMBBA members.<sup>(1)</sup>

SONIA and RONIA provide a daily source of data on overnight money market interest rates and volumes. They also provide the reference rates for overnight index swaps, which are used by market participants to hedge or speculate on changes in future short-term interest rates. Rates on these swaps can be used to infer market expectations of future overnight interest rates. But both measures currently capture a relatively small proportion of total transactions in the overnight money market, around 25% of the unsecured market and 10% of the secured market. Contacts note that this is largely because of an increased preference for market participants to transact directly with one another rather than through a broker.

A more comprehensive, but less timely, source of data is the Sterling Money Market Survey, carried out by the Bank on

behalf of the Money Market Liaison Group.<sup>(2)</sup> The survey, run since May 2011, is conducted twice a year and is designed to capture broad trends in money market activity. This has the broadest coverage of money market activity. Respondents, which include the most active bank participants in the sterling money market, are asked to provide quantitative and qualitative information about a range of wholesale sterling money market transactions. The Bank also administers a quarterly survey of the secured sterling money market, which began in 1996.<sup>(3)</sup>

Another indicator of activity is the estimated volume and the weighted average interest rate of unsecured overnight trades derived from the UK CHAPS payments system. This is the system through which sterling unsecured transactions between settlement banks are settled. This measure includes all overnight transactions, except for those that are settled using the same settlement bank.<sup>(4)</sup> The estimated volumes are therefore likely to be higher than those recorded by SONIA, but lower than those reported to the Sterling Money Market Survey.

The Bank also obtains information about conditions in, and the functioning of, the overnight sterling money market through its own operations. The Bank complements this information with regular conversations with its counterparties through its market intelligence programme.<sup>(5)</sup>

(1) For further details on SONIA and RONIA, see [www.wmba.org.uk](http://www.wmba.org.uk).

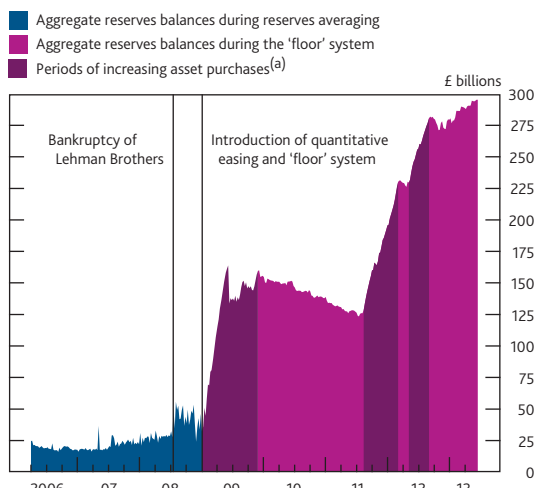
(2) See The Bank of England (2013b).

(3) See Bank of England (1996).

(4) For further details of this measure, see Millard and Polenghi (2004).

(5) For further details of this programme, see Fisher (2011).

Chart 1 Aggregate reserves balances



(a) Excluding purchases that represent the reinvestment of proceeds from matured gilts.

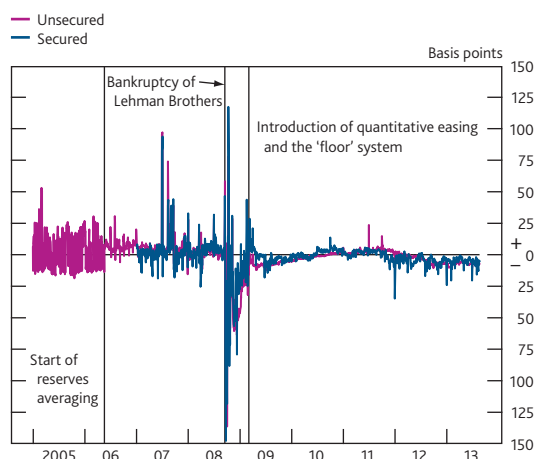
## The introduction of the floor system

At its meeting on 5 March 2009, the MPC announced that the Bank would begin a programme of asset purchases financed by the creation of central bank reserves (known as 'quantitative easing').<sup>(1)</sup> This resulted in a large and sustained increase in reserves supplied to the banking system.<sup>(2)</sup> Aggregate reserves balances increased by around £260 billion between March 2009 and August 2013, compared with the increase of around £30 billion between July 2007 and December 2008 (Chart 1).

At the same time as introducing quantitative easing, the Bank suspended reserves averaging and implemented a 'floor'

(1) For a description of the design and aims of quantitative easing, see Joyce, Tong and Woods (2011).

(2) The Bank purchased gilts and, to a lesser extent, corporate assets, from a range of investors. If the Bank purchases an asset, financed by the issuance of central bank reserves, from a non-bank company, it pays for the asset via the seller's bank while the bank then creates a deposit for the non-bank company. The corresponding reserves are accrued to the reserves account of the seller's bank. See Benford *et al* (2009).

**Chart 2** Spread of overnight interest rates to Bank Rate

Sources: Wholesale Markets Brokers' Association and Bank calculations.

system, in which all reserves account balances were remunerated at Bank Rate. This allowed the Bank to increase the aggregate supply of reserves through its asset purchases without interfering with the implementation of the MPC's policy rate in the money markets.

Remunerating all reserves at Bank Rate provides a 'floor' to market interbank overnight interest rates because it means that individual banks with reserves accounts have no incentive to lend reserves in the market at a rate below that at which reserves are remunerated by the Bank. If money market rates are below Bank Rate, reserves account holders can — at least in theory — arbitrage a riskless profit by borrowing at the market rate and placing the money in their reserves account. **Table A** shows that, on average, overnight interest rates have been within 2 or 3 basis points of Bank Rate since the introduction of the floor system, and have been slightly closer to the policy rate than during the reserves averaging period.

The floor system and the large quantity of reserves also led to a further reduction in the volatility of overnight interest rates compared to both that at the peak of the crisis and during the earlier period of reserves averaging (**Chart 2**). The standard deviation of the spread of unsecured interest rates to Bank Rate rose from 9 basis points during the reserves

**Table A** Developments in overnight interest rates

Basis points		Reserves averaging <sup>(a)</sup>	Peak crisis period <sup>(b)</sup>	Floor system <sup>(c)</sup>
Mean spread to Bank Rate	Unsecured	6	-30	-3
	Secured	3	-26	-2
Standard deviation of spread to Bank Rate	Unsecured	9	35	4
	Secured	11	39	5

Sources: Wholesale Markets Brokers' Association and Bank calculations.

(a) 18 May 2006-31 August 2008.  
 (b) 1 September-31 December 2008.  
 (c) 5 March 2009-16 August 2013.

averaging period to 35 basis points in the 'peak crisis period', but has since fallen to around 4 basis points (**Table A**).

## Structural developments

There have also been a number of structural factors since the start of the financial crisis with implications for the current and future functioning of overnight money markets. These include:

- an increased awareness of credit and liquidity risk;
- a decline in unsecured money market activity and growth of the secured market;
- the introduction of prudential liquidity regulation; and
- changing incentives for SMF participants to arbitrage money market rates.

These trends are discussed in turn below. Many of these developments are part of wider trends in global money markets, as discussed in the box on page 231.

### An increase in perceptions of credit and liquidity risk

The failure of Lehman Brothers in September 2008 caused major disruption to the financial system, and the money markets in particular. It led market participants to reconsider both the likelihood that their counterparties might fail as well as their own liquidity risk. This had implications both for interest rates and for activity in the overnight market.

One immediate effect was an increase in the differentiation of unsecured overnight interest rates that market participants demanded for lending to different banks. Prior to the crisis, the credit risk of lending to banks was generally perceived to be low and reasonably uniform across all institutions, particularly for lending overnight. As a result, unsecured overnight rates traded at only a small premium above secured rates. But the crisis led market participants to increasingly differentiate between counterparties based on perceptions of their credit risk. Banks that other market participants perceived to be riskier paid higher interest rates to borrow, even at an overnight maturity. **Chart 3** shows the widening range of unsecured overnight interest rates paid by market participants after September 2008. The increase in the range of interest rates paid for secured overnight borrowing was typically less severe, reflecting the fact that lending was secured against collateral (**Chart 4**).

Since 2009, the range of brokered unsecured overnight interest rates has narrowed, largely because of the increase in reserves and an improvement in perceptions of banks' credit risk since the height of the crisis.

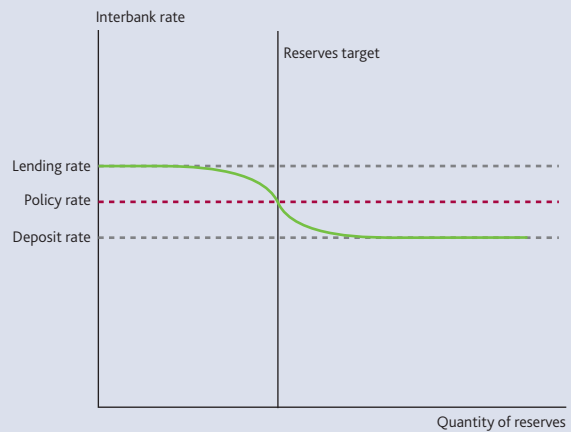
A further consequence of the heightened sensitivity to credit and liquidity risk was a reduction in banks' appetite to use the

## The reserves averaging framework

Between May 2006 and March 2009, the Bank influenced overnight interest rates through a system of reserves averaging.<sup>(1)</sup> This system aims to create a close and stable relationship between overnight market rates and Bank Rate, and encourage banks to manage their own liquidity actively through the sterling interbank money market. Commercial banks set voluntary reserves targets each month, and the Bank supplied sufficient reserves, in aggregate, for banks to meet their targets. Banks' reserves balances were remunerated at Bank Rate, provided their average reserves balances between one MPC decision and the next was within a small range around the targets they had set themselves. Institutions were charged a penal rate if their reserves balances were on average above or below the target range.

The introduction of reserves averaging significantly increased the Bank's influence over overnight interest rates. The Bank used a 'corridor system' in which banks could borrow or deposit reserves using the Bank's standing facilities at interest rates fixed above and below Bank Rate, respectively.<sup>(2)</sup> As commercial banks were typically unwilling to trade in the market at rates worse than those available from the Bank, these standing facilities provided a corridor within which overnight rates traded. A stylised illustration of the demand for reserves is depicted in **Figure A**. If, for example, reserves were in short supply, banks may be willing to bid rates higher in the money market to gain additional reserves, but not higher than the level at which a bank could borrow from the Bank's lending facility. Similarly, if a bank had an excess of reserves, it would not lend these at a rate below that which it could receive for placing reserves on the Bank's deposit facility. As such, provided market overnight rates traded within the corridor created by the standing facilities, banks were incentivised to trade with each other, rather than with the Bank, to meet their reserves targets.

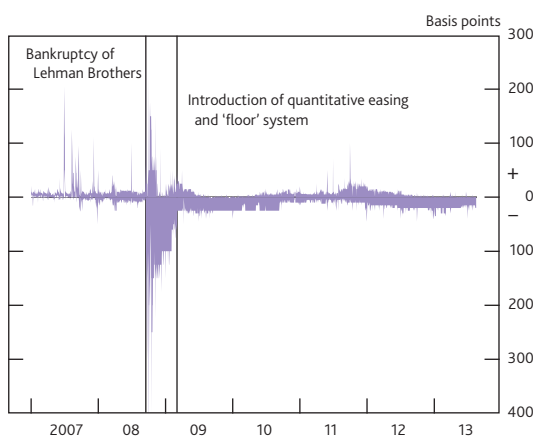
**Figure A** Stylised demand for reserves in a 'corridor system'



In addition, the ability of banks to vary their day-to-day reserves balances with the Bank, while still meeting their reserves targets on average over a maintenance period ensured that overnight interest rates remained close to Bank Rate throughout the period, as well as within the corridor. If banks expected the Bank to supply the correct amount of liquidity on the final day of the maintenance period — so that the overnight rate would be close to Bank Rate — then the overnight rate would also remain close to Bank Rate throughout the rest of the maintenance period.<sup>(3)</sup> This is because banks only had to meet their reserves target on average over the period. This allowed them to increase or decrease their reserves balance to take advantage of divergences between the market rate and the rate expected on the final day of the maintenance period.

(1) For a detailed account of the reserves averaging framework, see Clews (2005).  
 (2) In 2006, the lending and deposit rates were 1 percentage point above or below Bank Rate, except for the last day of each maintenance period when they were 0.25 percentage points above or below Bank Rate.  
 (3) This result is known as the 'martingale property'. See Mac Gorain (2005).

**Chart 3** Range of the spread of brokered unsecured overnight rates to Bank Rate



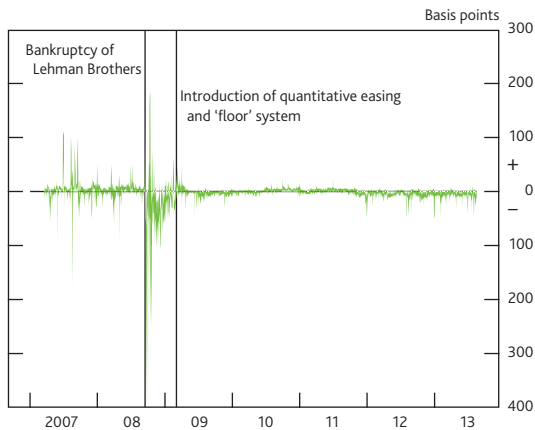
Sources: Wholesale Markets Brokers' Association and Bank calculations.

money market to manage their liquidity. Instead, during the peak of the financial crisis, banks increasingly preferred to transact directly with the Bank. The Bank supplied additional reserves to banks as they increased their reserves targets, and borrowed reserves back through draining operations. As a result, activity in the private money market fell — particularly in segments most exposed to bank credit risk, such as unsecured interbank transactions of longer maturities.

### A decline in unsecured money market activity and growth of the secured market

The significant increase in reserves and the introduction of the floor system in March 2009 further reduced banks' need to use the private money market to manage their liquidity. The higher supply of reserves provided banks with larger buffers with which to absorb payment shocks. And the introduction

**Chart 4** Range of the spread of brokered secured overnight rates to Bank Rate



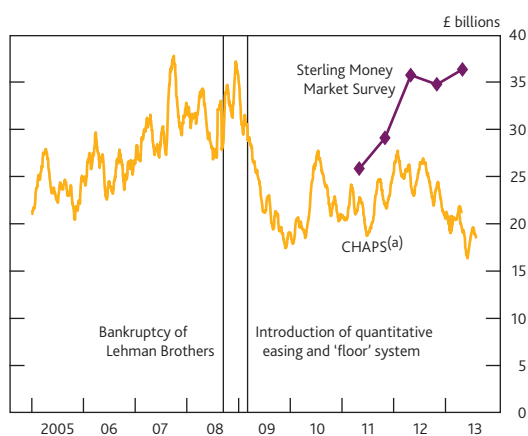
Sources: Wholesale Markets Brokers' Association and Bank calculations.

of the floor system meant that banks no longer needed to actively manage their reserves balances to meet a target in order for their reserves to be remunerated at Bank Rate. This reduced banks' need to use the money market, even as fears of further shocks to the banking system began to abate.

The effect of high levels of reserves on money market activity has been particularly pronounced in unsecured markets.

**Chart 5** shows that estimates of the daily volume of unsecured overnight trades derived from the CHAPS payment system fell by around a third shortly after the introduction of the floor system.

**Chart 5** Turnover in the overnight unsecured money market



Sources: Bank of England and Money Market Liaison Group Sterling Money Market Survey.

(a) Twenty working day moving average. Estimated from daily payments made through the CHAPS payment system. CHAPS data do not include payments where both legs are conducted through the same settlement bank, which is likely to be the main difference between the Sterling Money Market Survey and CHAPS.

Contacts report that the decline in unsecured activity was most severe for interbank transactions. In contrast, non-bank market participants, such as money market funds and non-financial corporates, have remained relatively active in

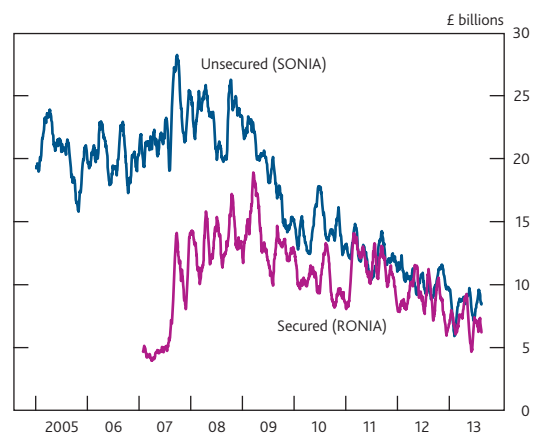
lending to banks. As a result, non-banks' share of the unsecured overnight market has grown. Banks reported in the most recent Sterling Money Market Survey that they sourced around 70% of their overnight unsecured borrowing from non-banks. While banks currently have little need or desire for unsecured interbank trading, many continue to maintain some presence in the wider overnight market in order to foster existing client relationships with non-bank institutions. This is both to maintain these client relationships for other parts of their business, as well as to protect a potential source of short-term borrowing should banks need it.

The involvement of non-bank institutions in the secured market has also grown in recent years, incentivised by the similar returns on offer between secured and unsecured lending despite the lower credit risk of the former.

Non-banks, however, remain a less significant feature of the secured market compared to the unsecured market. Contacts report that a number of factors have prevented a faster transition to secured trading, including the relative complexity of establishing the operational capability to trade in the secured money market.

After the sharp initial fall in activity, turnover in the unsecured overnight market since 2010 has been relatively stable. The Sterling Money Market Survey, which began in May 2011, even reports something of an increase in overnight money market activity since the survey's inception (**Chart 5**). Indicators of market activity derived from brokered transactions suggest a more sustained decline in turnover since 2008 (**Chart 6**). But the recent divergence between SONIA volumes and other measures reflects the declining importance of brokered transactions relative to bilateral transactions. Market intelligence suggests that this is driven by the greater importance that market participants attach to client relationships and greater discrimination in their choice of

**Chart 6** Turnover in brokered unsecured and secured overnight money markets<sup>(a)</sup>



Sources: Wholesale Markets Brokers' Association and Bank calculations.

(a) Twenty working day moving average.

counterparties. This has reduced market participants' use of brokers as, with fewer potential counterparties to which they are willing or permitted to lend, there is less need to use an intermediary to find potential borrowers.

Some of the decline in unsecured overnight money market activity may only be temporary. Interbank activity may increase with a fall in the level of reserves as and when unconventional monetary policy unwinds, requiring banks to manage their reserves balances by borrowing and lending more actively in the interbank money market. But banks are unlikely to return to their pre-crisis reliance on short-term interbank funding, reflecting sustained aversion to bank credit risk and prudential liquidity regulations.

A sustained period of low unsecured interbank activity could have implications for market infrastructure. In general, contacts believe that, despite the fall in activity, they have retained the skills, staff and operational capabilities needed to manage their reserves balances and liquidity as and when activity picks up. Many money market trading desks, however, have reportedly consolidated and reduced staff numbers. Some smaller desks have diversified their activities to utilise spare capacity.

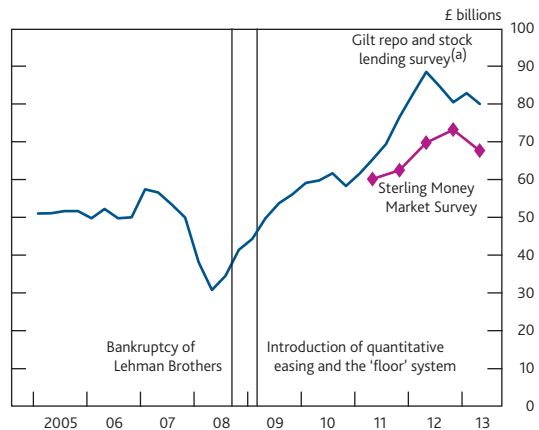
In contrast to the unsecured market, activity in the secured market appears to have increased since the start of the financial crisis. **Chart 7** shows that the value of overnight repo transactions recorded by the gilt repo and stock lending survey has steadily grown since the peak of the financial crisis. And secured transactions currently constitute around two thirds of total overnight activity recorded by the Sterling Money Market Survey. In part, the growth of the secured relative to the unsecured market reflects market participants' attempts to reduce their exposure to bank credit risk. Contacts also note, however, the important role played by prudential liquidity regulation, which incentivises banks to borrow on a secured rather than unsecured basis. These rules are discussed below.

One result of an increased preference for secured, rather than unsecured, lending is a rise in demand for collateral. Higher demand for collateral may, all else equal, push down on secured overnight interest rates. This is because secured interest rates reflect both demand for cash and demand for the collateral. The more scarce collateral is, relative to supply, the lower the interest rate that market participants generally demand to lend their cash for collateral.

### Prudential liquidity regulation

The strengthening of prudential liquidity regulation, both at a national and global level, has important implications for how banks manage their liquidity risk and has altered banks' incentives to use overnight money markets.<sup>(1)</sup>

**Chart 7** Turnover in the overnight secured money market



Sources: Gilt repo and stock lending survey, Money Market Liaison Group Sterling Money Market Survey and Bank calculations.

(a) Four-quarter moving average of outstanding repo and reverse repo transactions. Amounts outstanding and turnover are equivalent when the maturity of trades is overnight. Includes intragroup activity and activity involving the official sector.

The Prudential Regulation Authority's (PRA's) Individual Liquidity Guidance (ILG), introduced in 2010, requires UK banks to hold a stock of liquid assets against estimated wholesale net cash flows during a liquidity stress scenario. The Basel III reforms will require banks from 2015 onward to transition to the Liquidity Coverage Ratio (LCR), a metric conceptually similar to ILG.<sup>(2)</sup> The PRA confirmed in August 2013 that it would amend its current liquidity framework such that firms should, until 1 January 2015, aim to hold highly liquid assets broadly equivalent to 80% of the LCR agreed in January 2013 by the Basel Committee on Banking Supervision, rising thereafter to 100% by January 2018.<sup>(3)</sup>

These liquidity metrics assume that, in a liquidity stress scenario, banks lose different sources of funding at different rates. Banks are incentivised to use types of borrowing with lower 'run-off rates' — the rates at which banks are assumed to lose funding — because they do not have to hold so many liquid assets against them. In essence, these run-off rates provide banks with incentives to replace short-term, unsecured funding from banks with secured borrowing, unsecured borrowing at longer maturities, or borrowing from non-bank institutions.

Banks have become more sensitive to the type, maturity and source of their liquidity and funding as a result of these regulations. In particular, contacts believe that liquidity regulations are likely to keep short-term unsecured interbank borrowing volumes at relatively subdued levels, while encouraging banks to manage their liquidity through trading in the secured market. Banks have also reportedly become less

(1) For background information on the concept of liquidity for the banking sector, see 'Bank capital and liquidity' on pages 201–15 of this edition of the *Bulletin*.

(2) For further details of the Liquidity Coverage Ratio, see [www.bis.org/publ/bcbs238.pdf](http://www.bis.org/publ/bcbs238.pdf).

(3) See [www.bankofengland.co.uk/publications/Pages/news/2013/099.aspx](http://www.bankofengland.co.uk/publications/Pages/news/2013/099.aspx).

willing to lend reserves unsecured because it reduces their liquid asset buffer, as reserves are considered to be the most liquid asset. Consequently, some banks, particularly smaller institutions, have significantly reduced their use of wholesale unsecured markets, preferring to use a combination of longer-term funding and holding reserves at the central bank to manage their liquidity needs.

### Changes in incentives to arbitrage money market rates and Bank Rate

Since the introduction of the floor system, overnight rates have typically traded close to Bank Rate, with volatility at historically low levels (Table A). Under the floor system, the remuneration of all reserves at Bank Rate and arbitrage by reserves account holders should, in theory, keep overnight interest rates in the market close to Bank Rate. Reserves account holders should have no incentive to lend reserves below the rate they receive by depositing them with the Bank. By contrast, institutions without access to reserves accounts — such as non-banks — may be willing to lend at rates below Bank Rate. But if, as a result of this, market rates fell below Bank Rate, banks could earn a risk-free — or 'arbitrage' — profit by borrowing reserves in the market and depositing them with the Bank, where they earn Bank Rate. This should drive overnight interest rates back towards Bank Rate.

Since mid-2012, however, overnight rates have traded around 5–10 basis points below Bank Rate (Chart 2). Contacts report that banks have been unwilling to bid up for cash offered by non-banks at rates below Bank Rate. There are two reasons for this. First, banks' demand for short-term liquidity fell. Contacts note that this reflected several factors including banks' ongoing efforts to reduce their reliance on short-term wholesale funding, a reduction in the perceived risk outlook and a relaxation of regulatory liquidity requirements.<sup>(1)</sup>

Second, banks have become less willing to borrow to arbitrage overnight rates against their reserves accounts. Such borrowing increases the size of their balance sheets and leverage ratios.<sup>(2)</sup> Since the start of the crisis, banks have been trying to deleverage their balance sheets to wind down holdings of certain 'legacy' assets accumulated in the run-up

to the crisis and conform to national and international regulatory requirements. The 2013 Q1 *Bank Liabilities Survey* found that the most common reason for banks' limited appetite to increase short-term wholesale borrowing was a desire to manage the size of their balance sheet.<sup>(3)</sup> As a result, many banks have increased the returns they require to justify a given amount of borrowing. Contacts report that they will typically not arbitrage low overnight rates until they are up to 10 basis points below Bank Rate.

The expansion in the number and variety of reserves account holders since 2009 may, however, over time help to strengthen the arbitrage mechanism. In October 2009, the Bank widened the population of institutions eligible to hold reserves accounts and access the Bank's facilities.<sup>(4)</sup> As of 5 September 2013, there were 112 reserves account holders, compared with 45 in July 2008. All else being equal, this should reduce the likelihood that interest rates diverge from Bank Rate because more institutions are able to use the Bank's facilities as an alternative to the money market and arbitrage differences between Bank Rate and market rates.

### Conclusion

This article has described the role played by the sterling overnight money market in the implementation of the MPC's interest rate decisions. The financial crisis and the MPC's asset purchase programme have led the Bank to adapt how it influences overnight interest rates. Nevertheless, overnight interest rates have remained close to the Bank's policy rate. The structure of the market, however, has changed. Some of these developments may, in time, reverse. The fall in unsecured interbank turnover, which is in part a consequence of the high levels of aggregate reserves, may partially unwind as and when monetary policy and the level of reserves normalise. But other changes are likely to have a more lasting effect. In particular, the growth of the secured market is likely to be sustained, as liquidity regulations and banks' own risk aversion deter unsecured activity. The Bank will continue to monitor these developments, as well as those in the wider money market.

(1) See [www.fsa.gov.uk/library/communication/statements/2012/fpc.shtml](http://www.fsa.gov.uk/library/communication/statements/2012/fpc.shtml).

(2) A bank's leverage ratio is calculated as its total assets divided by its capital base. See 'Bank capital and liquidity' on pages 201–15 of this edition of the *Bulletin*.

(3) This refers to the three months to the beginning of March 2013. The 2013 Q1 *Bank Liabilities Survey* is available at [www.bankofengland.co.uk/publications/Documents/other/monetary/bls/bls13q1.pdf](http://www.bankofengland.co.uk/publications/Documents/other/monetary/bls/bls13q1.pdf).

(4) The Bank expanded its eligibility criteria such that all institutions that are required to report eligible sterling liabilities to the Bank are eligible to apply to hold reserves accounts; previously, only those reporting eligible liabilities over £500 million could apply.



## An international comparison

Overnight money markets in other countries have also experienced changes as a result of the financial crisis. This box examines such developments in the United States and euro area. It also draws on the experience of Japan, both since the 2007 crisis and during the Bank of Japan’s quantitative easing and zero interest rate policies between 2001 and 2006.

### An increase in the supply of reserves

A response to the financial crisis common across central banks was the significant increase in the supply of central bank reserves. This was often in excess of the level banks were required to hold or even demanded to hold as a precautionary buffer.

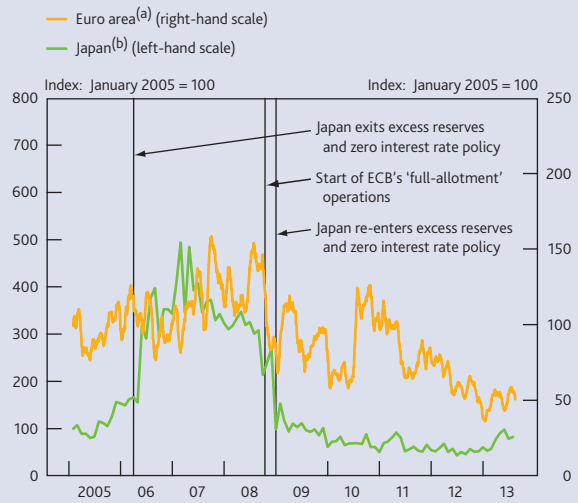
In the United States and Japan, these increases related to their asset purchase programmes, financed by central bank reserves. In the euro area, the increase in reserves was largely demand-led. Since October 2008, the European Central Bank (ECB) has run so-called ‘full-allotment’ operations which allow banks to borrow as much as they need at a fixed rate, subject to having suitable collateral.

### Low turnover

As in the sterling market, the large increase in reserves led to initial declines in market turnover, particularly in unsecured markets (**Chart A**).<sup>(1)</sup> Central banks took the place of the money market, as banks no longer needed to access the market to the same degree to manage their liquidity and respond to payment shocks, relying instead on the central bank. The effect of high reserves can be seen most starkly in the case of Japan. When the Bank of Japan reduced reserves after its 2001–06 quantitative easing operations, unsecured overnight activity rose sharply. But in 2009, when the Bank of Japan markedly increased the amount of reserves again, activity fell back sharply.

Market participants have also cited similar incentives to transact on a secured basis to those in the sterling money market, including lenders’ increased concerns over

**Chart A** Turnover in overnight unsecured money markets



Sources: Bank of Japan, Bloomberg and Bank calculations.

(a) Twenty working day moving average.  
 (b) Value outstanding at month end.

counterparty credit risk and the proposed need to meet prudential liquidity regulations. These have decreased the attractiveness of trading unsecured relative to secured.

As in the United Kingdom, the decline in international money market activity has had an impact on money market infrastructure. Market participants in the euro area have reported a decline in the number of credit limits they maintain to lend to other banks.<sup>(2)</sup> And between 2001 and 2006, the Bank of Japan found that, as well as cutting credit limits to lend to other banks, many banks downsized their money market desks and systems.<sup>(3)</sup> This restricted the flow of liquidity to banks wishing to borrow in the interbank market.

(1) While data on turnover in the federal funds market are not published, Federal Reserve Bank of New York (2012) notes a significant fall in turnover after the rise in reserves balances in 2008.

(2) See European Central Bank (2012).

(3) See Bank of Japan (2006).

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