Quarterly Bulletin

2012 Q4 | Volume 52 No. 4

BANK OF ENGLAND

BANK OF ENGLAND

Quarterly Bulletin

2012 Q4 | Volume 52 No. 4

Executive summary

Recent economic and financial developments (pages 289–304)

Markets and operations. This article reviews developments in financial markets and the Bank's official operations in the period between the previous *Bulletin* and 26 November 2012. In general, the review period has been marked by an improvement in market sentiment around near-term risks, following supportive policy announcements in the euro area and the United States. Concerns persist, however, over US fiscal negotiations and longer-term prospects for the euro area. Bank and corporate funding conditions improved during the review period, with the Funding for Lending Scheme contributing to a reduction in bank funding costs compared with those in the United States and Europe. The article also summarises market intelligence regarding moves toward client clearing of standardised over-the-counter derivatives through central counterparties (CCPs) and the drivers behind recent moves away from the use of CCPs in the repo market.

Research and analysis (pages 305–70)

The Funding for Lending Scheme (by Rohan Churm, Jeremy Leake, Amar Radia, Sylaja Srinivasan and Richard Whisker). Over the twelve months to June 2012, the intensification of the crisis in the euro area caused bank funding costs and, in turn, interest rates on loans to households and businesses, to increase. In response to that, the Funding for Lending Scheme (FLS) was launched over the summer by the Bank of England and HM Treasury. It is designed to incentivise banks and building societies to boost their lending to UK households and businesses. Specifically, banks and building societies are offered funding with both the amount and its price depending on the amount they lend. While the elevated cost of funding is one factor restricting the amount of credit that financial institutions wish to supply, lending could also be inhibited by other supply factors, and by weak credit demand. But by reducing funding costs, the FLS should lead to more and cheaper credit flowing into the real economy than otherwise. Early signs have been encouraging: market funding costs for UK banks have fallen sharply and many loan rates have fallen. Given the usual lags from credit being offered to loans being made, the FLS is unlikely to materially affect lending volumes until 2013. The Bank of England will monitor a range of indicators in order to assess the impact of the FLS on lending. It has also started publishing quarterly data, for all participating groups, showing their lending to the UK economy and their borrowing from the Bank.

What can the money data tell us about the impact of QE? (by Nicholas Butt, Sílvia Domit, Lewis Kirkham, Michael McLeay and Ryland Thomas). The UK economy has received a significant amount of monetary stimulus since the onset of the financial crisis. Bank Rate has been reduced to its lowest level in its 318-year history and the Monetary Policy Committee has purchased £375 billion worth of assets since the launch of its asset purchase programme (or QE) in early 2009. £200 billion of assets were purchased between March 2009 and January 2010 ('QE1'); £125 billion of assets were purchased between October 2011 and May 2012 ('QE2'); and a further £50 billion of assets were purchased between July 2012 and November 2012 ('QE3'). QE should affect broad money directly, without requiring an increase in bank lending. So this article investigates what impact QE has had on broad money using a 'money accounting framework' and focusing on the period during which the second round of asset purchases took place. Although money growth has been weak since 2008, the evidence suggests that it has been boosted by QE. The monetary impact of QE2 looks very similar to

that of QE1, with around 60% of asset purchases having fed through into broad money. But whereas in QE1 most of the 40% 'leakage' could be explained by bank balance sheet repair, during QE2 the largest leakage came from sales of government debt by banks. So whereas the first two rounds of QE seem to have had a similar proportionate impact on money, there is some evidence that the transmission mechanism of QE may have varied over time.

Influences on household spending: evidence from the 2012 NMG Consulting survey (by Philip Bunn, Robert Johnson, Jeanne Le Roux and Michael McLeay). Household spending has been subdued since the 2008/09 recession, reflecting weakness in real incomes and increased saving rates. This article presents some new evidence from a survey carried out for the Bank by NMG Consulting on the state of households' finances and the reasons behind their recent spending and saving decisions. The survey shows that nominal incomes have been broadly flat over the past year, and rises in prices will have eroded the spending power of that income. Tight credit conditions and concerns about debt levels appear to be the two biggest factors that have supported household saving. The fiscal consolidation has also boosted saving to a smaller extent. While households have become more uncertain about their future incomes, there is not clear evidence that this has boosted saving. The survey implies that household saving is likely to remain close to its current level over the next year, with concerns about debt levels and tight credit conditions continuing to be important, although to the extent that the FLS eases credit conditions, that may encourage households to increase spending relative to their current expectations.

The role of designated market makers in the new trading landscape (by Evangelos Benos and Anne Wetherilt). Many trading venues for financial securities or contracts rely on market makers for the provision of liquidity. A designated market maker (DMM) — the focus of this article — has a contractual arrangement with the trading venue to do so. This typically includes obligations to provide continuous price quotes during a large part of the trading day and to reduce large price swings. In fulfilling these obligations, DMMs contribute to market liquidity and price efficiency. They can therefore help mitigate the financial stability problems that arise when liquidity disappears in stressed market conditions. With obligations come benefits: trading venues typically provide a range of privileges and rewards to DMMs for their services. But changes in the trading environment such as the fragmentation of markets have eroded some of the benefits that DMMs have traditionally enjoyed. Moreover, in many venues, DMMs now compete with high-frequency traders, who act as *de facto* market makers, but who can enter and exit the market at will. These developments have opened a debate on the role and usefulness of DMMs. The article concludes that DMM contracts with well-designed obligation and reward structures can continue to play a useful role in today's trading venues.

The Prudential Regulation Authority (by Andrew Bailey, Sarah Breeden and Gregory Stevens). The financial crisis has powerfully demonstrated the need for a new approach to financial regulation. Major reforms are therefore under way, aiming to establish a UK regulatory framework which is more focused on the issues that matter and better equipped to deliver financial stability. These reforms will come into effect in April 2013. The Financial Services Authority will cease to exist in its current form, and its responsibilities will be transferred to two new bodies — the Prudential Regulation Authority (PRA), a part of the Bank of England, focusing on prudential issues; and the Financial Conduct Authority, a separate body, focusing on business and market conduct. Additionally, a Financial Policy Committee will be established within the Bank, focusing on the stability of the financial system as a whole. This article focuses on the PRA. It sets out the PRA's role in the new regulatory framework, describing the PRA's statutory objectives of promoting the safety and soundness of firms and contributing to policyholder protection. The PRA will advance these objectives by setting out expectations that firms should meet. The article goes on to describe how the PRA will supervise firms against these expectations. Importantly, it will do this using a judgement-based approach, and one that is both forward looking and focused on the key risks posed to the stability of the UK financial system.

Research work published by the Bank is intended to contribute to debate, and does not necessarily reflect the views of the Bank, MPC or FPC members.

Contents

Recent economic and financial developments

Research and analysis

Speeches

Appendices

The contents page, with links to the articles in PDF, is available at
www.bankofengland.co.uk/publications/Pages/quarterlybulletin/default.aspx

Author of articles can be contacted at
forename.surname@bankofengland.co.uk

The speeches contained in the *Bulletin* can be found at
www.bankofengland.co.uk/publications/Pages/speeches/default.aspx

Except where otherwise stated, the source of the data used in charts and tables is the Bank of England or the Office for National Statistics (ONS). All data, apart from financial markets data, are seasonally adjusted.

Recent economic and financial developments

Markets and operations

This article reviews developments in financial markets, including the Bank's official operations, between the 2012 Q3 *Quarterly Bulletin* and 26 November 2012.[1] The article also summarises market intelligence on selected topical issues relating to market functioning.

Financial markets

Overview

Over the review period as a whole, financial market sentiment showed signs of improvement. That was, in part, due to the European Central Bank's (ECB's) announcement of a prospective programme of Outright Monetary Transactions (OMTs) in September. Many contacts thought that the announcement of this programme had eliminated the risk of a disorderly unwind of euro-area imbalances in the short term. Markets were calmed further by the Federal Open Market Committee's (FOMC's) announcement that it would continue its large-scale purchases of agency mortgage-backed securities (MBS) until the labour market showed tangible signs of recovery, contributing to a further reduction in volatility across a range of asset classes. As a result of these measures, investors appeared to become more willing to bear risk and there was a significant improvement in conditions in wholesale funding markets.

Later in the review period, worries over the sustainability of debt positions and the possibility of a disorderly unwind of external imbalances in the euro area resurfaced. And tensions rose further due to concerns over the US 'fiscal cliff', with speculation in markets that political negotiations may fail to produce an agreement on the speed and composition of deficit reduction. This led to some reversal of earlier asset price rises. Shortly after the data cut-off, confidence was boosted by signs of progress toward a resolution of near-term difficulties surrounding Greek debt, with a corresponding rally in asset prices.

There was an improvement in borrowing conditions in capital markets for the most vulnerable sovereigns in the euro area, with the Italian and Spanish governments each taking the opportunity to issue longer-maturity debt. At the same time, there was a slight rise in the yields of sovereign debt issued by countries viewed in markets as 'safe havens', such as Germany, the United States and the United Kingdom. Increased willingness to hold risky assets also encouraged issuance of debt by European banks and corporates. In the United Kingdom, the Funding for Lending Scheme (FLS) also contributed to the reduction in bank funding costs. As of 3 December, 35 banks and building societies had signed up to the Scheme, representing 82% of the stock of lending to the domestic economy. See the article by Churm *et al* on pages 306–20 in this *Bulletin* for further details.

Despite the decline in bank borrowing costs, UK lenders were largely absent from public funding markets over the review period. Contacts suggested that this was likely to be because the large UK banks had completed the bulk of their planned public wholesale long-term debt issuance earlier in the year.

This article concludes with a section that sets out market intelligence relating to implementation of the G20 requirement that all standardised over-the-counter (OTC) derivatives be cleared through central counterparties (CCPs). Separately, it explores a recent trend for repo market transactions to move away from CCPs.

Monetary policy and short-term interest rates

The Bank of England's Monetary Policy Committee (MPC) maintained Bank Rate at 0.5% throughout the review period. The additional £50 billion of asset purchases announced following the July policy meeting was completed by the end of October, taking the stock of asset purchases to £375 billion. The MPC left the stock of assets to be purchased unchanged at the November policy meeting.

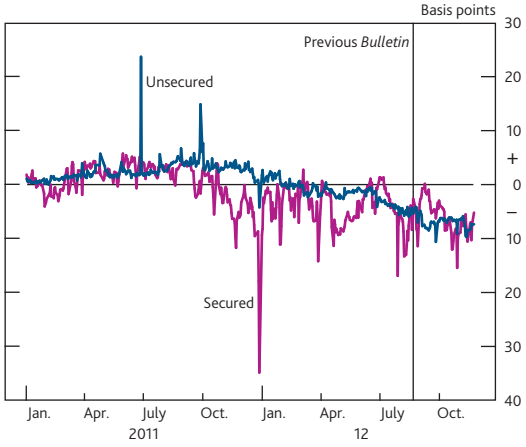
On 9 November, the Government and Bank of England announced that net cash held by the Asset Purchase Facility (APF) would be transferred to the Exchequer. Since the start of the asset purchase programme in 2009, the gilts held by the APF have accumulated regular coupon payments, expected to sum to a current net cash position of around £35 billion by March 2013. This cash will be transferred to the Exchequer on an incremental basis, with an initial £11 billion to be transferred during the 2012/13 financial year and a further £23.8 billion over the course of 2013/14. Any subsequent cash surplus will be transferred on a quarterly basis from 2013/14.[2] In line with MPC communications, contacts noted that the change in APF cash arrangements implied a monetary stimulus.

(1) The data cut-off for the previous *Bulletin* was 24 August 2012.
(2) For further details, see www.hm-treasury.gov.uk/press_109_12.htm.

A Reuters poll of economists conducted shortly after the review period indicated that expectations for further asset purchases had fallen. The median of economists' central expectations was for asset purchases to remain at £375 billion, £50 billion lower than reported in the previous survey. Contacts cited various factors that may have lowered their expectations of the total amount they expected the MPC to spend on asset purchases.

As in the previous review period, sterling overnight market interest rates remained below Bank Rate (**Chart 1**). Possible reasons for this are discussed in the box on page 292. Forward sterling overnight index swap (OIS) rates also remained below Bank Rate out to maturities of two years, perhaps because market participants expect the weakness of overnight market interest rates to persist. But sterling forward OIS rates rose materially during the review period (**Chart 2**). Few contacts placed much weight on the possibility of a cut in Bank Rate by the time of the data cut-off, citing, among other factors, the discussion of the potential impact of such a move contained in the November MPC minutes. Consistent with this, the Reuters poll of economists conducted just after the review period showed that the median expectation was for no change in Bank Rate over the horizon of the poll, which runs until mid-2014.

Chart 1 Spread to Bank Rate of weighted average sterling overnight interest rates

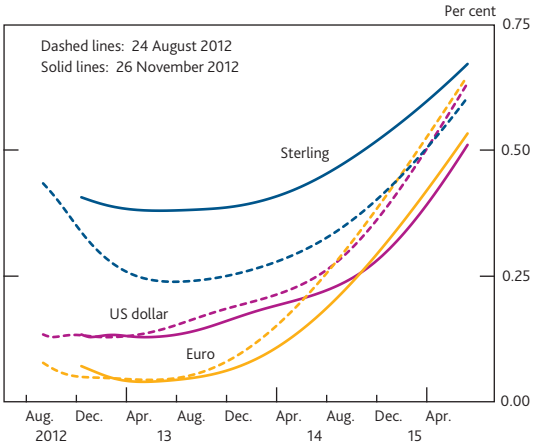


Sources: Bloomberg and Bank calculations.

Elsewhere, the ECB kept its main interest rates unchanged. The subdued pace of economic growth led contacts to expect that very low interest rates would persist for some time. After the review period, comments at the December ECB press conference led contacts to place increased weight on the possibility of a further reduction in policy rates.

In the United States, the FOMC agreed in September that it would purchase additional agency MBS at a rate of US$40 billion per month. Together with its existing policies of reinvesting principal payments of agency securities and

Chart 2 Instantaneous forward interest rates derived from OIS contracts[a]



Sources: Bloomberg and Bank calculations.

(a) Instantaneous forward rates derived from the Bank's OIS curves.

extending the maturity of its asset holdings, the FOMC estimated that this would increase the Federal Reserve's holdings of longer-term securities by about US$85 billion each month. The FOMC stated that it would continue to undertake additional asset purchases and employ its other policy tools as appropriate until, in the context of price stability, the outlook for the labour market had improved substantially. The FOMC also expected that economic conditions were likely to warrant exceptionally low levels for the federal funds target rate until mid-2015, six months later than anticipated at the end of the previous review period.

Long-term interest rates

There was a significant improvement in sentiment following the announcement of a prospective programme of OMTs by the ECB in September. Contacts viewed the announced measures as a credible backstop for the Spanish and Italian bond markets and believed that they had removed a source of near-term tail risk. Spanish and Italian government bond yields fell on the day of the announcement, while there was a rise in the yields of government bonds perceived to carry the least credit risk, including Germany, the United States and the United Kingdom (**Chart 3**).

Other events also contributed to the improvement in market sentiment, such as the German Constitutional Court ruling that the country would be able to participate in the European Stability Mechanism. And in mid-October, there was further tightening in the spread between Spanish and German government bond yields following Moody's unexpected decision to leave the investment-grade credit rating of Spanish government debt unchanged.

Spanish and Italian governments took advantage of improved funding market conditions by increasing the size of their bond auctions and extending the maturity of issues. Their combined

Recent moves in sterling overnight interest rates

Since March 2009, the Bank has implemented the MPC's Bank Rate decisions via a 'floor system' in which all central bank reserves are remunerated at Bank Rate.(1) Only banks with reserves accounts at the Bank can hold reserves and so earn Bank Rate. Because reserves account holders are unlikely to be willing to lend these reserves at below the rate they can obtain by depositing them with the Bank, the overnight lending rate of reserves account holders should not fall below Bank Rate.

The overnight money market includes participants other than reserves account holders, however. Overnight interest rates measured by indices of brokered trades(2) include a significant amount of overnight lending to banks from non-bank institutions that are not reserves account holders, such as corporates and money market funds. Without the option of depositing reserves with the Bank, non-bank institutions may be willing to lend cash overnight at rates below Bank Rate.

If overnight rates are below Bank Rate, banks with reserves accounts can earn a small profit by borrowing overnight and depositing reserves with the Bank of England to earn Bank Rate. Overnight rates would be bid upward towards Bank Rate if reserves account holders were willing to compete for cash from non-banks to obtain this profit.

In recent months, brokered overnight interest rates have tended to be below Bank Rate (**Chart 1**). Contacts report that reserves account holders have been less willing to compete for overnight cash for two reasons.

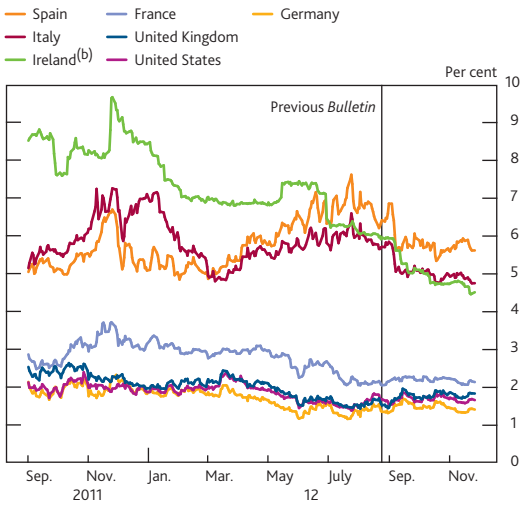
First, UK banks' demand for overnight liquidity has fallen since June 2012, reducing the rate they are willing to pay for overnight deposits. Contacts note that, in part, this reflects some banks recommencing efforts to reduce their reliance on short-term wholesale funding in general. In 2012 Q2, heightened concerns about spillovers from the euro-area crisis and the implications of Moody's banking sector ratings review had led banks to pause in their pursuit of this longer-term goal. In addition, adjustments to the Financial Services Authority's liquidity guidelines and the activation of the Extended Collateral Term Repo Facility reduced banks' desire to borrow overnight.

A second reason banks cite for being less willing to compete for overnight cash is their increased sensitivity to the impact of this borrowing on the size of their balance sheets. At a time when banks are focused on ways to use their balance sheets more efficiently, some reserves account holders report that they had become less inclined to exploit small arbitrage opportunities. For example, some contacts report that they might need a 10 basis point spread before they start to take advantage of the arbitrage opportunity — that is a much larger spread than in the past.

Looking ahead, contacts expect banks to begin to arbitrage deviations of overnight rates from Bank Rate should rates fall much below the level observed during the 2012 Q4 review period.

(1) In March 2009, the Bank suspended its previous system of 'reserves averaging' for implementing Bank Rate. For further details, see 'The Red Book', www.bankofengland.co.uk/markets/Pages/sterlingoperations/redbook.aspx.
(2) The unsecured overnight interest rate is measured by the sterling overnight index average (SONIA). The secured overnight interest rate is measured by the repurchase overnight index average (RONIA). Both indices are provided by the Wholesale Markets Brokers' Association. For further details, see www.wmba.org.uk.

Chart 3 Selected euro-area ten-year government bond yields(a)



Source: Bloomberg.

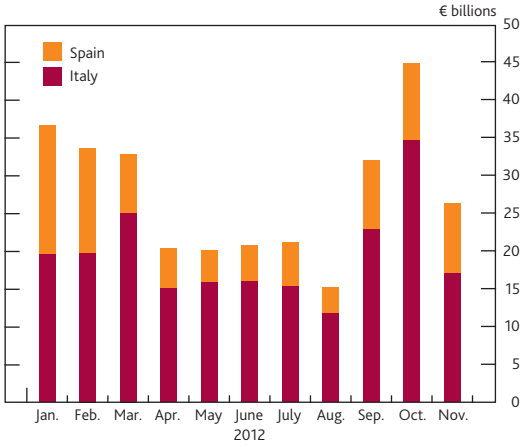
(a) Yields to maturity on ten-year benchmark government bond.
(b) Yield to maturity on eight-year government bond.

monthly issuance in October was the highest in the year to date (**Chart 4**). The Spanish government successfully issued a 20-year bond — the longest-maturity bond it has issued since May 2011. Despite these positive developments, the levels of Spanish and Italian bond yields remained well above those of some other euro-area countries.

Towards the end of the period, investor optimism was curbed by prolonged negotiations over the Greek debt restructuring plan and concerns surrounding Spanish indebtedness. Subsequently, after the end of the review period, euro-area Finance Ministers agreed on a package of measures aimed at reducing the Greek debt burden, which cleared the way for the disbursement of €43.7 billion of financial aid. There followed an immediate but short-lived reduction in periphery government bond spreads over bunds.

In the United States, over the review period as a whole, yields on Treasuries were broadly unchanged. But early in the review

Chart 4 Gross monthly proceeds from government bond issuance by Italy and Spain



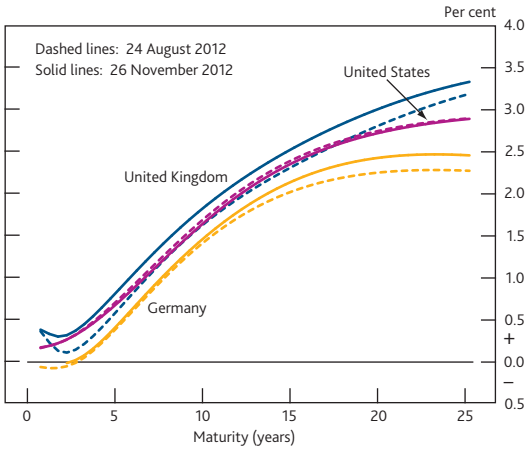
Sources: Dealogic and Bank calculations.

period, the September FOMC announcement of additional monetary stimulus via purchases of agency MBS caused long-dated government nominal yields to rise. Market-implied inflation expectations initially picked up as well, before subsequently falling back. Contacts scaled back expectations of further government bond purchases following the change in policy.

Later on in the review period, the US presidential election result on 7 November was followed by a fall in US Treasury yields. According to contacts, investors thought that the re-election of President Obama was likely to make the upcoming fiscal negotiations more difficult, and that could, in turn, depress US growth.

While US Treasury yields were unchanged overall, a partial reversal of safe-haven flows left German and UK sovereign bond yields a little higher than at the time of the 2012 Q3 *Quarterly Bulletin* (**Chart 5**).

Chart 5 International nominal government bond spot yield curves[a]



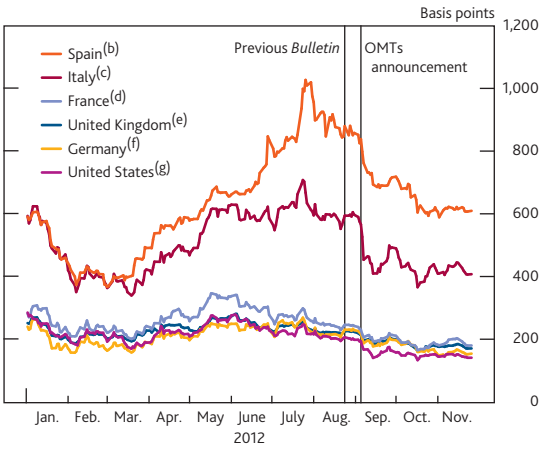
Source: Bank calculations.

(a) Spot interest rates derived from the Bank's government liability curves.

Bank funding markets

Bank funding market conditions improved further over the review period, with declines in indicative measures of wholesale market funding costs, such as bank credit default swap (CDS), in a number of countries (**Chart 6**). This represented the continuation of a trend under way since July.

Chart 6 Selected international banks' CDS premia[a]

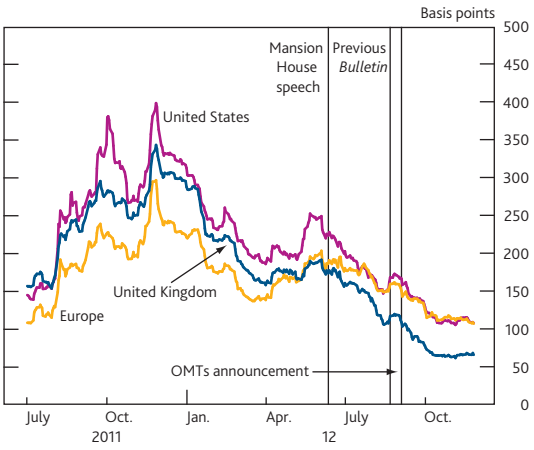


Sources: Markit Group Limited and Bank calculations.

(a) Unweighted averages of five-year, senior CDS prices.
(b) Average of Banco Popular Espanol, Bankia, BBVA, Caixa, Sabadell and Santander.
(c) Average of Banco Popolare, Intesa Sanpaolo, Monte dei Paschi and UniCredit.
(d) Average of BNP Paribas, Crédit Agricole, Natixis and Société Générale.
(e) Average of Barclays, HSBC, Lloyds Banking Group, Nationwide, Royal Bank of Scotland and Santander UK.
(f) Average of Commerzbank and Deutsche Bank.
(g) Average of Bank of America Merrill Lynch, Citi, Goldman Sachs, JPMorgan, Morgan Stanley and Wells Fargo.

UK lenders benefited from positive spillovers as a result of policy announcements in the euro area, and contacts reported that the Bank's FLS had provided a further fillip to investor confidence. For more details, see the article by Churm *et al* on pages 306–20 in this *Bulletin*. On average, funding conditions appear to have improved more for UK lenders compared with those in Europe and the United States (**Chart 7**).

Chart 7 Indicative senior unsecured bond spreads[a]



Source: Bloomberg.

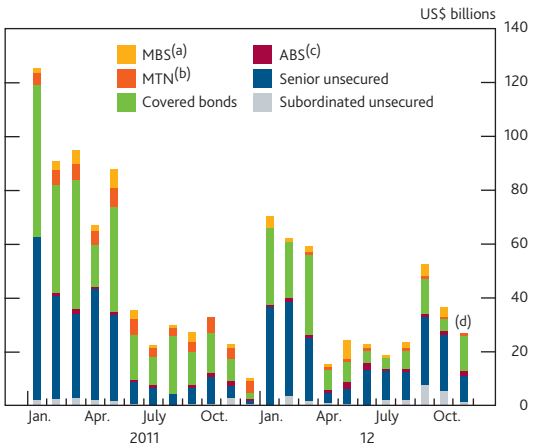
(a) The data show an unweighted average of the spread between euro-denominated senior unsecured bonds and equivalent-maturity swap rates, for a selected bond issued by each of a selection of large banks in the region. The selected bonds have residual maturities of between two and six years.

Despite the improvement in bank funding market conditions over the period, there was little public term debt issuance by UK banks. Contacts attributed the absence of UK banks from the funding market to the fact that many of them had completed their planned public long-term debt issuance earlier in the year. Contacts also cited UK banks' modest funding intentions overall, in the context of limited plans among lenders for balance sheet expansion, and a desire to reduce their reliance on wholesale markets. UK banks also reduced their activity in private funding markets over the review period.

While CDS premia and secondary market bond spreads for UK banks declined during the review period, the absence of primary market activity has created an element of uncertainty around the precise cost of funding facing lenders. That is, in part, because of the lack of observable primary market transactions. Also, contacts reported that secondary market bond spreads had been pushed down by the scarcity of primary market issuance.

In contrast to UK banks, other lenders in the European Union (EU) were active in public term funding markets (**Chart 8**). Notable transactions over the review period included the first Portuguese bank to issue senior unsecured debt without a government guarantee since March 2010, and the first US dollar issuance from a Spanish bank since May 2011. In addition to this issuance by some large lenders, a few 'second-tier' banks from euro-area periphery countries were able to issue in the senior unsecured markets, although some others suspended deals due to insufficient investor appetite.

Chart 8 Term issuance by European (excluding UK) lenders in public markets

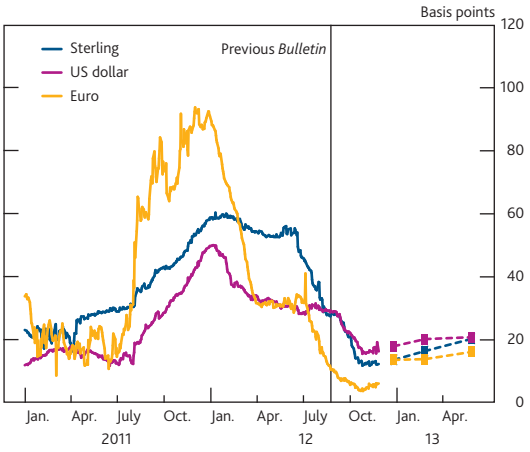


Sources: Dealogic and Bank calculations.

(a) Commercial and residential mortgage-backed securities.
(b) Medium-term notes.
(c) Asset-backed securities.
(d) Data up to 26 November 2012.

The price of funding in short-term money markets continued to fall, with a further decline in the spread between the London interbank offered rate (Libor) — the rate at which banks report that they can borrow on a short-term basis — and OIS — a proxy for the 'risk-free' rate (**Chart 9**). The three-month sterling and euro Libor-OIS spreads both fell to levels not seen since late 2007. According to contacts, these trends reflect a reduced desire by banks to borrow in the money market, combined with lenders demanding less compensation for the credit risk associated with lending to banks at short maturities.

Chart 9 International three-month spot and forward Libor-OIS spreads(a)(b)

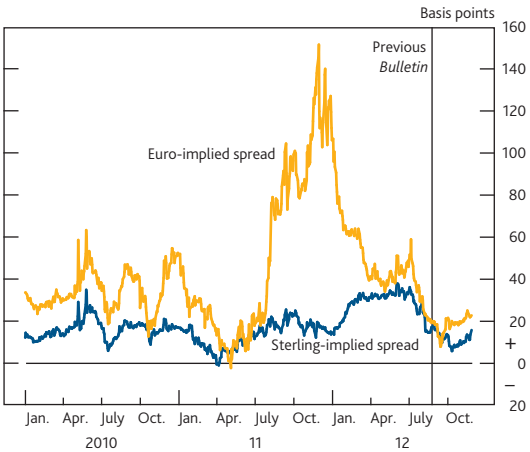


Sources: Bloomberg, British Bankers' Association and Bank calculations.

(a) Three-month Libor-OIS spreads derived from Libor fixings and OIS rates.
(b) Forward spreads derived using data as at 26 November. The squares are implied forward spreads using forward Libor and Euribor derived from forward rate agreements, and forward OIS rates derived from the OIS curve.

Conditions in short-term US dollar funding markets for UK banks also improved, with a reduction in the cost of borrowing directly in dollars, as well as in the cost of swapping sterling into dollars via the foreign exchange market. The cost of raising dollars by swapping out of euro increased over the review period, but remains well below recent peaks (**Chart 10**).

Chart 10 Spread of foreign exchange implied cost of three-month US dollar funding over US dollar Libor(a)



Sources: British Bankers' Association, Reuters and Bank calculations.

(a) Spread of three-month US dollar Libor implied from foreign exchange forwards over actual three-month US dollar Libor. For more details on the construction of these measures see *Bank of England Quarterly Bulletin*, Vol. 48, No. 2, page 134, Chart 26 and *BIS Quarterly Review*, March 2008, pages 73–86.

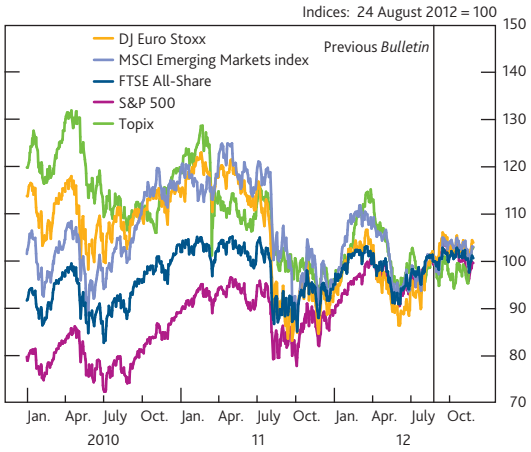
There were positive developments in conditions in subordinated bank debt markets during the review period. In the United Kingdom, there was a large issue of contingent capital by one of the major UK banks. And issuance of Tier 2 capital by other European banks was strong, including the first such transaction from a euro-area periphery issuer in over 18 months.

Contacts noted that the pickup in European issuance was likely to have been motivated by 'grandfathering' arrangements, under which subordinated bonds issued before the beginning of 2013 would not be subject to certain elements of capital rules under Basel III. The exemption makes instruments issued before this deadline more attractive to investors and hence cheaper for banks to issue.

Corporate capital markets

The FTSE All-Share and S&P 500 were broadly flat over the review period, while the DJ Euro Stoxx rose 4% (**Chart 11**). While equity indices had been fairly flat, corporate bond spreads and yields had fallen further during the review period (**Chart 12**). And contacts noted that there had been heavy inflows into European non-investment grade debt from UK pension funds, exchange-traded funds and retail investors, via corporate bond funds. Some contacts suggested that in the context of low yields on less risky assets, in part as a result of policy stimulus, investors had become more prepared to consider investing in riskier assets.

Chart 11 International equity indices(a)(b)

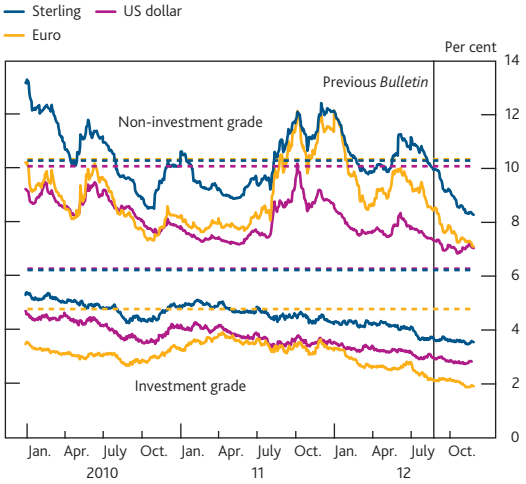


Sources: Bloomberg and Bank calculations.

(a) Indices are quoted in domestic currency terms, except for the MSCI Emerging Markets index, which is quoted in US dollar terms.
(b) The MSCI Emerging Markets index is a capitalisation-weighted index that monitors the performance of stocks in emerging markets.

In the United States, there was a slight decline in corporate bond yields over the review period as a whole. Contacts attributed a recent pickup to high levels of supply of new corporate debt issuance (in some cases from lower credit quality firms) as well as to weaker corporate results than had been expected by markets.

Chart 12 International non-investment grade and non-financial investment-grade corporate bond yields(a)



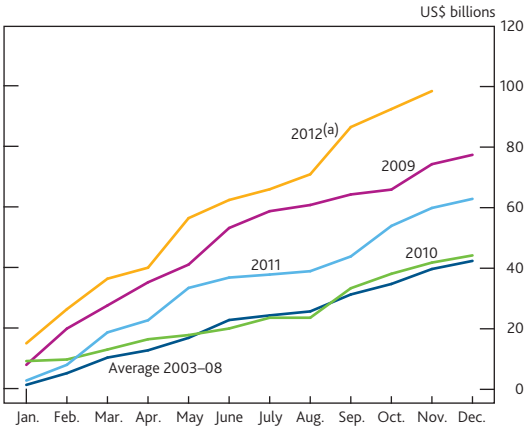
Sources: Bank of America Merrill Lynch and Bank calculations.

(a) Dashed lines: 1997–2007 averages for investment-grade bonds and 1998–2007 averages for non-investment grade bonds.

European corporates continued to take advantage of the positive sentiment in markets by issuing in large volumes. And between September and October, the share of euro-area issuance from corporates based in the euro-area periphery rose from 27% to over 50%. This included the first issue from an unrated periphery corporate since February 2011.

In the United Kingdom, both gross and net corporate bond issuance continued to grow apace (**Charts 13** and **14**). Contacts reported that issuance had been motivated mainly by refinancing, rather than a desire to fund investment. There were further signs of growth in the retail bond market, although the size of the market remains small. During the second half of the year there were several deals from FTSE 350 non-financial companies, often without public ratings, or access to wholesale corporate bond markets. Contacts reported that these deals attracted significant demand from retail investors.

Chart 13 Cumulative gross bond issuance by UK private non-financial corporations



Sources: Dealogic and Bank calculations.

(a) Data up to 26 November 2012.

Operations within the Sterling Monetary Framework and other market operations

This box describes the Bank's operations within the Sterling Monetary Framework over the review period, and other market operations. The level of central bank reserves was determined by (i) the stock of reserves injected via the Asset Purchase Facility (APF); (ii) the level of reserves supplied by indexed long-term repo (ILTR) operations and the Extended Collateral Term Repo (ECTR) Facility; and (iii) the net impact of other sterling ('autonomous factor') flows across the Bank's balance sheet.

Operational Standing Facilities

Since 5 March 2009, the rate paid on the Operational Standing Deposit Facility has been zero, while all reserves account balances have been remunerated at Bank Rate. Reflecting this, average use of the deposit facility was £0 million in each of the August, September and October maintenance periods. Average use of the lending facility was also £0 million.

Indexed long-term repo open market operations

As part of its provision of liquidity insurance to the banking system, the Bank conducts ILTR operations. These typically occur once each calendar month. Participants are able to borrow against two different sets of collateral: one set corresponds with securities eligible in the Bank's short-term repo operations ('narrow collateral'); the other set contains a broader class of high-quality debt securities that, in the Bank's judgement, trade in liquid markets ('wider collateral').

During the review period, the Bank offered £5 billion via three-month ILTR operations on both 11 September and 9 October, and £2.5 billion via a six-month operation on 13 November (**Table 1**).

Usage was limited compared with previous quarters, and cover ratios continued to be at very low levels. There are two possible reasons for the low bank demand for three and six-month liquidity via the ILTR operations. First, short-term secured market interest rates remain below Bank Rate — the minimum bid rate in the ILTR operations — making repo markets a potentially cheaper source of liquidity. Second, APF gilt purchases financed by the creation of central bank reserves continued to boost the liquidity of the banking system, which may have reduced the need for counterparties to use the ILTR operations to meet their short-term liquidity needs (**Chart A**).

Extended Collateral Term Repo Facility

The ECTR Facility is a contingent liquidity facility, designed to mitigate risks to financial stability arising from a market-wide shortage of short-term sterling liquidity.[1] In the three months to 21 November 2012, the Bank conducted three ECTR auctions, offering £5 billion in each (**Table 2**).

Table 1 Indexed long-term repo operations

	Total	Collateral set summary	
		Narrow	Wider
11 September 2012 (three-month maturity)			
On offer (£ millions)	5,000		
Total bids received (£ millions)[a]	320	55	265
Amount allocated (£ millions)	220	55	165
Cover	0.06	0.01	0.05
Clearing spread above Bank Rate (basis points)		0	5
Stop-out spread (basis points)[b]	5		
9 October 2012 (three-month maturity)			
On offer (£ millions)	5,000		
Total bids received (£ millions)[a]	5	5	0
Amount allocated (£ millions)	5	5	0
Cover	0.00	0.00	0.00
Clearing spread above Bank Rate (basis points)		1	n.a.
Stop-out spread (basis points)[b]	n.a.		
13 November 2012 (six-month maturity)			
On offer (£ millions)	2,500		
Total bids received (£ millions)[a]	155	5	150
Amount allocated (£ millions)	155	5	150
Cover	0.06	0.00	0.06
Clearing spread above Bank Rate (basis points)		0	15
Stop-out spread (basis points)[b]	15		

(a) Due to the treatment of paired bids, the sum of bids received by collateral set may not equal total bids received.
(b) Difference between clearing spreads for wider and narrow collateral.

Chart A ILTR allocation and clearing spreads

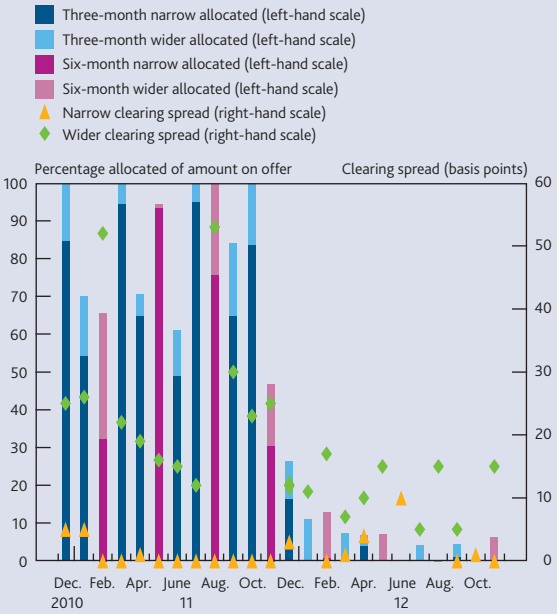


Table 2 ECTR operations

	Total
19 September 2012	
On offer (£ millions)	5,000
Amount allocated (£ millions)	150
Clearing spread above Bank Rate (basis points)	25
17 October 2012	
On offer (£ millions)	5,000
Amount allocated (£ millions)	0
Clearing spread above Bank Rate (basis points)	n.a.
21 November 2012	
On offer (£ millions)	5,000
Amount allocated (£ millions)	0
Clearing spread above Bank Rate (basis points)	n.a.

The September operation cleared at the minimum bid spread to Bank Rate of 25 basis points. There was no usage of the Facility in either the October or November operations. Contacts attributed this fall in demand to a number of factors. These included the ample quantity of liquidity in the banking system, the passing of event risk, and the desire of some banks to retain their collateral for use in the Funding for Lending Scheme (FLS).

On 20 November, the Bank announced that, after the upcoming December operation, the ECTR Facility would remain activated, but that the Bank would review demand for auctions on a monthly basis in consultation with ECTR-eligible institutions. Should the Bank determine that there is sufficient demand, it will hold an auction, normally on the third Wednesday of the month. Auctions will be pre-announced by the Bank on the preceding business day at 4 pm. There would not be an announcement in months when the Bank judges that no ECTR auction is required.(2) The parameters in the Market Notice of 15 June 2012, including the minimum bid rate (25 basis points over Bank Rate) and term of borrowing (six months), will continue to apply to transactions under the ECTR Facility. The Bank will keep the operation of the Facility under review, taking into account market conditions.

Discount Window Facility

The Discount Window Facility (DWF) provides liquidity insurance to the banking system by allowing eligible banks to borrow gilts against a wide range of collateral. On 2 October 2012, the Bank announced that the average daily amount outstanding in the DWF between 1 April 2012 and 30 June 2012, lent with a maturity of 30 days or less, was £0 million. The Bank also announced that the average daily amount outstanding in the DWF between 1 April 2011 and 30 June 2011, lent with a maturity of more than 30 days, was £0 million.

Other operations

Funding for Lending Scheme(3)

The FLS was launched by the Bank and the Government on 13 July. The FLS is designed to incentivise banks and building societies to boost their lending to UK households and non-financial companies, by providing term funding at rates below those prevailing in the market at the time. The quantity each participant can borrow in the FLS, and the price it pays on its borrowing, is linked to its performance in lending to the UK non-financial sector.

The drawdown window for the FLS opened on 1 August 2012 and will run until 31 January 2014. The Bank publishes quarterly data showing, for each group participating in the FLS, the amount borrowed from the Bank, and the net quarterly flows of lending to the UK non-financial sector. On 3 December 2012 the Bank published data showing that a total of 35 groups had signed up to the FLS, and a total of £4.36 billion had been drawn under the FLS as at 30 September 2012.(4)

US dollar repo operations

Since 11 May 2010, the Bank has offered weekly fixed-rate tenders with a seven-day maturity to offer US dollar liquidity, in co-ordination with other central banks, and will continue to do so until further notice. Since 12 October 2011, the Bank has also offered US dollar tenders with a maturity of 84 days. This arrangement is currently scheduled to end on 1 February 2013. As of 21 November 2012, there had been no use of the Bank's US dollar facilities.

Bank of England balance sheet: capital portfolio

The Bank holds an investment portfolio that is approximately the same size as its capital and reserves (net of equity holdings, for example in the Bank for International Settlements, and the Bank's physical assets) and aggregate cash ratio deposits. The portfolio consists of sterling-denominated securities. Securities purchased by the Bank for this portfolio are normally held to maturity, though sales may be made from time to time, reflecting, for example, risk or liquidity management needs or changes in investment policy. The portfolio currently includes around £3.4 billion of gilts and £0.4 billion of other debt securities. Over the review period, gilt purchases were made in accordance with the quarterly announcements on 2 July and 1 October 2012.

(1) Further details are available at www.bankofengland.co.uk/markets/Pages/money/ectr/index.aspx.
(2) Further details are available at www.bankofengland.co.uk/markets/Documents/marketnotice121120.pdf.
(3) For further detail on the FLS see Churm *et al* on pages 306–20 in this *Bulletin*.
(4) For further details see www.bankofengland.co.uk/markets/Pages/FLS/data.aspx.

Asset purchases(1)(2)

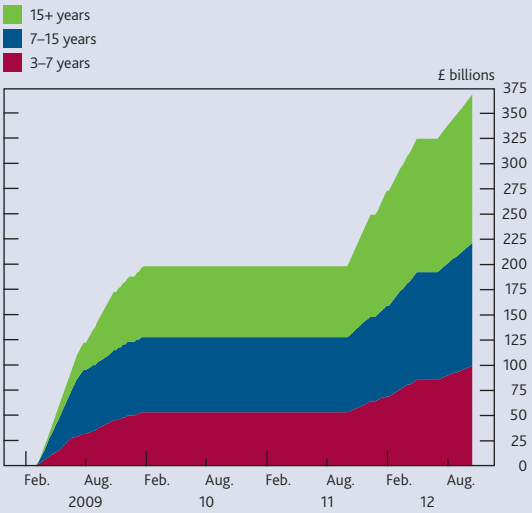
In the week prior to the November Monetary Policy Committee (MPC) meeting, the Bank completed the £50 billion programme of asset purchases — financed by the issuance of central bank reserves — that had been announced by the MPC on 5 July.(3) As of 22 November, outstanding asset purchases financed by the issuance of central bank reserves were £375 billion, in terms of the amount paid to sellers. On 8 November, the MPC voted to maintain the stock of asset purchases financed by the issuance of central bank reserves at £375 billion. **Table 1** summarises asset purchases by type of asset.

Gilts

A total of £29.2 billion of gilt purchases were completed during the review period. These purchases were split broadly equally across the three maturity sectors via 27 gilt purchase auctions for £1 billion each, and two further auctions for £1.1 billion each. The total amount of gilts purchased since the start of the asset purchase programme in March 2009, in terms of the amount paid to sellers, was £374.9 billion, of which £101.7 billion of purchases were in the 3–7 year residual maturity range, £123.8 billion in the 7–15 year residual maturity range and £149.5 billion with a residual maturity greater than 15 years (**Chart A**).

Cover in the gilt purchase auctions averaged 2.2 in the 3–7 year maturity sector, 3.1 in the 7–15 year maturity sector and 2.1 in the auctions for gilts with a maturity greater than 15 years. This was broadly in line with cover in the previous Asset Purchase Facility gilt purchases.(4) The Bank continued to exclude gilts in which it held a large proportion (more than 70%) of the free float.

Chart A Cumulative gilt purchases(a) by maturity(b)



(a) Proceeds paid to counterparties on a settled basis.
(b) Residual maturity as at the date of purchase.

Table 1 Asset Purchase Facility transactions by type (£ millions)

Week ending(a)	Secured commercial paper	Gilts	Corporate bond		Total(b)
			Purchases	Sales	
23 August 2012(c)(d)	0	345,752		120	345,871
30 August 2012	0	2,000	0	4	1,996
6 September 2012	0	3,000	0	0	3,000
13 September 2012	0	3,000	0	8	2,992
20 September 2012	0	3,000	0	9	2,991
27 September 2012	0	3,000	0	1	2,999
4 October 2012	0	3,000	0	0	3,000
11 October 2012	0	3,000	0	10	2,990
18 October 2012	0	3,000	0	7	2,993
25 October 2012	0	3,000	0	26	2,974
1 November 2012	0	3,200	0	0	3,200
8 November 2012	0	0	0	8	-8
15 November 2012	0	0	0	0	0
22 November 2012	0	0	0	0	0
Total financed by a deposit from the DMO(d)(e)	–	–	13		13
Total financed by central bank reserves(d)(e)	–	374,949	30		374,979
Total asset purchases(d)(e)	–	374,949	43		374,992

(a) Week-ended amounts are for purchases in terms of the proceeds paid to counterparties, and for sales in terms of the value at which the Bank initially purchased the securities. All amounts are on a trade-day basis, rounded to the nearest million. Data are aggregated for purchases from the Friday to the following Thursday.
(b) Weekly values may not sum to totals due to rounding.
(c) Measured as amount outstanding as at 22 November 2012.
(d) In terms of proceeds paid to counterparties less redemptions at initial purchase price on a settled basis.
(e) Data may not sum due to assets maturing over the period and/or due to rounding.

Gilt lending facility(5)

The Bank continued to offer to lend some of its gilt holdings via the Debt Management Office (DMO) in return for other UK government collateral. In the three months to 30 September 2012, a daily average of £225 million of gilts was lent as part of the gilt lending facility. This was a little below the average of £386 million in the previous quarter.

Corporate bonds

The Bank continued to offer to purchase and sell corporate bonds via the Corporate Bond Secondary Market Scheme, with purchases financed by the issue of Treasury bills and the DMO's cash management operations.

Net sales of corporate bonds were lower during the review period compared with the period before, but this was unsurprising considering the portfolio's diminishing size. At the beginning of the quarter, the Bank's market contacts reported that demand to purchase bonds from the Corporate Bond Scheme had been supported by strong end-investor demand for corporate bonds, combined with low levels of inventories held by dealers. Towards the end of the period, participation in Corporate Bond Scheme sales declined as primary market issuance increased. As of 22 November 2012, the Bank's portfolio totalled £43 million, in terms of amount paid to sellers, compared to £120 million at the end of the previous review period.

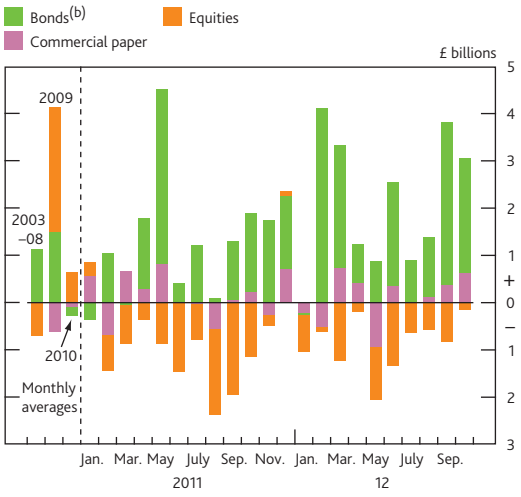
Secured commercial paper facility

The Bank continued to offer to purchase secured commercial paper (SCP) backed by underlying assets that are short term and provide credit to companies or consumers that support economic activity in the United Kingdom.(6) The facility remained open during the review period but no purchases were made.

(1) For further discussion on asset purchases see the *Asset Purchase Facility Quarterly Report* available at www.bankofengland.co.uk/publications/Pages/other/markets/apf/quarterlyreport.aspx.
(2) Unless otherwise stated the cut-off date for data is 22 November 2012.
(3) For further information, see the 5 July Market Notice, available at www.bankofengland.co.uk/markets/Documents/apf/marketnotice120705.pdf.
(4) Further details of individual operations are available at www.bankofengland.co.uk/markets/Pages/apf/gilts/results.aspx.
(5) For more details on the gilt lending facility see the box 'Gilt lending facility' in the *Bank of England Quarterly Bulletin*, Vol. 50, No. 4, page 253.
(6) The SCP facility is described in more detail in the Market Notice available at www.bankofengland.co.uk/markets/Documents/marketnotice120801.pdf.

Net equity issuance by UK private non-financial corporations (PNFCs) remained negative, due to the continued low level of new issuance, combined with ongoing repurchases of shares (**Chart 14**). Contacts attributed the popularity of equity buybacks to the perceived lack of investment opportunities for many corporates.

Chart 14 Net capital market issuance by UK PNFCs(a)



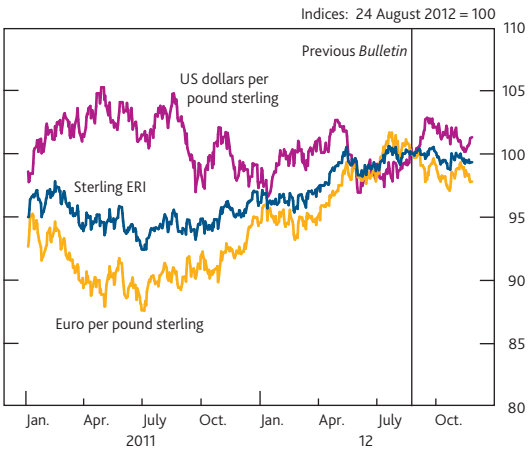
(a) Non seasonally adjusted.
(b) Includes standalone and programme bonds.

Foreign exchange

Activity in the foreign exchange (FX) market was fairly subdued during the review period, reflected in persistently low trading volumes across a range of FX platforms, both in spot and derivatives markets.

The level of the sterling exchange rate index (ERI) was broadly stable, remaining around the upper end of the trading range it has occupied over the past few years (**Chart 15**). But there were offsetting moves against the euro and the US dollar. Contacts cited the reduction in near-term tail risks associated with euro-area sovereign debt problems as the predominant factor behind the 2% appreciation in the euro against sterling by the end of the review period. Working in the other direction, sterling rose by 1.3% against the US dollar, perhaps reflecting further monetary loosening in the United States.

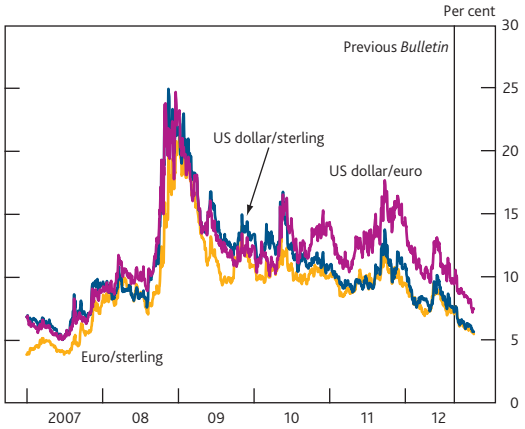
Chart 15 Sterling ERI and bilateral exchange rates



Sources: Bloomberg and Bank calculations.

According to contacts, a reduction in tail risks due to policy announcements in the euro area and the United States contributed to a compression in option-implied volatility across the major currency pairs, which were at five-year lows (**Chart 16**).

Chart 16 Three-month option-implied volatility of foreign exchange rates



Sources: Bloomberg, British Bankers' Association and Bank calculations.

Market intelligence on developments in market structure

In discharging its responsibilities to maintain monetary stability and contribute to financial stability, the Bank gathers information from contacts across a wide spectrum of financial markets. This intelligence helps inform the Bank's assessment of monetary conditions and possible sources of financial instability and is routinely synthesised with research and analysis in the *Inflation Report* and the *Financial Stability Report*. More generally, regular dialogue with market contacts provides valuable insights into how markets function, and gives context for policy formulation, including in the design and evaluation of the Bank's own market operations.

Based on intelligence of this kind, this section describes some of the issues surrounding implementation of the G20 requirement that all standardised over-the-counter (OTC) derivatives be cleared through central counterparty (CCP) clearing houses. It also explores the causes of a recent trend for repo market transactions to move away from CCPs.

Introduction of client clearing to OTC derivatives markets

In September 2009, the G20 agreed that all standardised OTC derivative transactions should be cleared through CCPs. Since then, various jurisdictions have been implementing mandates in local law. In Japan, inter-dealer interest rate swaps and credit default swaps have been mandated for clearing since November. In the United States and the EU respectively, the Dodd-Frank Act and European Market Infrastructure Regulation have become law, paving the way for mandatory clearing to come into force during 2013.

Many inter-dealer interest rate swap and CDS transactions are currently centrally cleared on a voluntary basis in the United States and the EU. But few 'buy-side' entities (such as hedge funds and asset managers) have traditionally cleared their OTC derivatives. The G20 reforms will require that many such buy-side firms start to centrally clear certain standardised derivatives. Contacts are positive about the risk-reduction benefits that the clearing of OTC derivatives will offer, such as netting and improved margining standards. But they also identify challenges that have arisen as the buy-side prepares for this new landscape.

Accessibility

To access central clearing, buy-side firms (also known as 'clients') need to establish relationships with one or more direct clearing members. A clearing member provides a guarantee to the CCP that it will stand behind its clients' cleared transactions. Establishing that relationship requires the clearing member and client to come to an agreement on how costs will be applied and how risks will be distributed. At the end of the review period, the industry was working to agree standardised documentation for OTC derivative client clearing.

Contacts report that there is a divide between the level of preparedness at larger investor institutions, such as major asset managers and hedge funds, and smaller firms. Many large clients have established or are close to finalising relationships with multiple clearing members, and have reportedly done so on favourable terms with respect to pricing and the amount of margin they must provide. But large numbers of smaller clients have reportedly been slow to act. While it is anticipated that some end-users will be exempt from the clearing requirement (such as corporates which primarily use OTC derivatives to hedge liabilities arising from commercial and treasury financing activity), it appears that a sizable proportion of non-exempt smaller clients have yet to establish client clearing relationships. Contacts thought that this may put them in a weaker negotiating position, with little choice but to accept terms offered by clearing members. Some contacts also suggested that a large proportion of client clearing could become concentrated in a small number of clearing members.

Margin

In contrast to common practice in current bilateral (that is, non-centrally cleared) markets, CCPs collect 'initial margin' to provide a buffer of protection against the potential cost of replacing a defaulting participant's positions. As a result, the move to clearing most standardised OTC derivatives is expected to heighten demand for CCP eligible collateral, such as high-quality government bonds. Although significant

uncertainties remain, estimates of the size of that additional demand are large.(1)

Netting is an important driver of collateral efficiency. In bilateral OTC derivatives markets, netting is usually applied to the entire portfolio of OTC derivatives between two counterparties, and any margin is based on the net exposure. One benefit of moving transactions to a CCP is that it introduces multilateral netting — instead of a counterparty having separate exposures to each other counterparty, it has a single exposure to the CCP representing the net of its exposures to the other CCP members. But contacts express concern that similar, naturally offsetting, products may not all be available for central clearing. For instance, were standardised 'plain vanilla' interest rate swaps to be mandated to be cleared, but no CCP available to clear swaptions (OTC options on interest rate swaps), a client could not receive the netting benefit between the two products which serve as natural hedges to each other. That lack of netting would require them to post more margin than if both products were centrally cleared at the same CCP. Many clients and clearing members are therefore keen for CCPs to expand their product offerings.

In addition, CCPs generally accept high-quality collateral only, such as cash and highly rated government bonds.(2) Some types of end-client have large holdings of government bonds which they can post as collateral. But others might not have sufficient eligible collateral and so will need to transform the assets they do hold into assets accepted as collateral by the CCP. This will present costs and risks for clients, particularly those with large transformation requirements. Some banks are reported to be starting collateral transformation businesses in anticipation of such demand.

CCPs also generally require additional 'variation margin' to be posted, in cash, when the market value of clients' derivative positions falls. Whereas, in bilateral markets, any such variation margin may also comprise securities. This will pose some further challenges for entities that typically have small cash holdings.

Portability

'Portability', or the ability to move a position from one clearing member to another, is an important safeguard in the move to client clearing. Clients may wish to 'port' positions because of concerns about the creditworthiness of a clearing member, or in the event of a clearing member defaulting. They may also want to move positions in order to minimise collateral requirements between cleared portfolios at different clearing members.

The terms of portability arrangements have reportedly become a point of contention during negotiation between clients and clearing members. Clients report that they would like to be able to port positions away without notice. But it is in the interests of clearing members to request notice before positions are ported in or out. And they are reluctant to guarantee that they will accept positions ported in, due to the contingent credit and liquidity risks, and potential cost of regulatory capital and liquidity requirements against those risks.

Larger clients are more likely than smaller ones to have established multiple clearing member (and CCP) relationships, which makes it easier to port positions if needed. Smaller clients relying on a single clearing member would need to set up an arrangement with an alternative member quickly in the event of the default of their original clearing member. If a client failed to post its position, the CCP would be likely to protect itself by triggering termination clauses in its transactions with the client.

Regulatory uncertainty

Contacts often report regulatory uncertainty to be an issue in the planning and implementation of client clearing. One area of concern is the lack of final dates for clearing mandates in the EU which makes it difficult to judge the relative merits of short-term versus long-term solutions. Another cause of concern is the uncertainty over extraterritoriality of EU and US rules, and in particular uncertainty over which CCPs will be eligible to meet clearing mandates in which jurisdictions.

Contacts agree that the introduction of client clearing represents a large structural change to the OTC derivatives market and are still working to understand its likely impact on costs, incentives and market structure.

Use of CCPs in European repo markets

A 'repo' transaction typically involves the sale of collateral — often government bonds — and an agreement to buy back equivalent securities at a future date. In practice, repo markets allow institutions to borrow or lend cash on a secured basis, and promote liquidity by allowing market participants to borrow or lend specific securities.

Repo is also widely used by central banks to implement monetary policy and to provide liquidity to banks. For instance, the Bank of England's Extended Collateral Term Repo Facility provides sterling liquidity against collateral pre-positioned in the Bank's Discount Window Facility.

Repo transactions are typically executed on a bilateral basis (for example, dealer-to-dealer), via a tri-party arrangement in which a third-party agent acts as custodian for the collateral, or via a CCP clearing house. In CCP-cleared repo, the CCP

(1) See the box on pages 38–39 of the Bank of England *Financial Stability Report*, June 2012.
(2) Some CCPs have expanded their range of eligible collateral.

becomes a party to both sides of a trade, acting as a buyer to the collateral seller and a seller to the collateral buyer.

During the financial crisis, some repo markets proved to be a less reliable source of liquidity than many had expected. And in September 2010, the BIS Committee on Payment and Settlement Systems Working Group on Repo Market Infrastructure suggested that using CCPs could be one means of making repo markets more resilient.(1) Also, more recently, a consultative document released by the Financial Stability Board (FSB) noted the potential benefits of wider use of CCPs for inter-dealer repo against safe collateral.(2) These arise from the resulting reduction in interconnectedness in the financial system and improved transparency.

Recent use of CCPs in repo markets

The use of CCPs to clear repo transactions declined during the year. The June 2012 International Capital Market Association (ICMA) repo market survey showed that the size of the European repo market fell to €5.7 trillion outstanding, from €6.2 trillion in December 2011. The contraction in European repo activity since December was attributed, in large part, to banks' substitution of some of their repo financing requirements for liquidity taken from the ECB's three-year longer-term refinancing operations. In the context of that overall decline in repo market activity, the proportion of CCP-cleared transactions fell to 26% of the total in the June 2012 survey, down from 32% in December 2011.(3) And market participants expect the size of repo positions outstanding on CCPs to have declined further since June.

But it is difficult to trace where this business has relocated to, if anywhere. Unfortunately, as recognised by the Bank of England chaired Securities Lending and Repo Committee Working Group(4) and the FSB, transparency in the bilateral repo market is poor. Nevertheless, market contacts noted that there had been an increase in the amount of bilateral inter-dealer repo. This was supported by the Money Market Liaison Group (MMLG) Sterling Money Market Survey, which showed a 10% increase in inter-dealer bilateral repo between November 2011 and May 2012.(5)

Drivers of change

CCP margins

In acting as both buyer and seller to a repo transaction, the CCP takes on the associated credit risk. It is very important then, that CCPs take steps to manage this risk. One means by which they do this, is to require the seller of collateral to back this secured borrowing with assets worth more than the value of the loan. This extra collateral is known as margin, and it acts as a buffer against fluctuations in the market value of the assets posted with the CCP.

According to market contacts, the primary reason for the decline in CCP-cleared repo has been an increase in the cost of using CCPs due to these margin requirements. In contrast, the convention in bilateral inter-dealer repo markets is to apply a very low, or zero, margin for certain transactions.

In addition, to protect themselves during periods of higher volatility in the value of collateral, CCPs will tend to raise margin requirements. And contacts report that the decline in CCP-cleared repo has been larger for repos of vulnerable euro-area government bond collateral, in part, for this reason. As CCP margins rose, it became more cost effective for banks to use other sources of liquidity, including the ECB's facilities.

While margin increases are likely to be cyclical and more prominent for repos of more volatile collateral, CCP margin requirements have also increased for higher-quality collateral. For instance, LCH.Clearnet Ltd (LCH) margin requirements for gilt general collateral have risen by 0.7 percentage points (to 4.2%) on average across all maturities over the year. Perhaps as a result, contacts report that the clearing of transactions backed by higher-quality collateral has fallen.

There have also been structural increases in the costs associated with using CCPs. For example, in August 2012, as a further means of reducing its exposure to credit risk arising from clearing repo transactions, LCH established a new ring-fenced default fund of approximately £500 million. Contacts suggest that this will have increased the contributions required from its members.

In addition to the rise in the cost of using CCPs over the course of the year, which result from steps to limit credit risk, perceptions of counterparty credit risk in the bilateral market have fallen recently. As a result, banks have reportedly been more content to lend to each other on a bilateral basis, albeit secured and for short periods.

Other drivers

Contacts cited three additional drivers for the decline of CCP-cleared repo:

First, certain bank treasury departments had refined their internal transfer pricing models, with repo desks now being charged more directly for margin costs. This had incentivised dealers to seek out more cost-effective ways to trade repo.

Second, there had been a structural increase in longer-term repo transactions. Contacts confirmed the findings of the June 2012 ICMA repo survey, which showed that there had

(1) See www.bis.org/publ/cpss91.pdf.
(2) See www.financialstabilityboard.org/publications/r_121118b.pdf.
(3) See www.icmagroup.org/Regulatory-Policy-and-Market-Practice/short-term-markets/Repo-Markets/repo/.
(4) See www.bankofengland.co.uk/publications/Documents/speeches/2012/speech591.pdf.
(5) For background on the MMLG Survey, see www.bankofengland.co.uk/publications/Documents/quarterlybulletin/mo12aug.pdf.

been an increase in structured repo trades with contractual maturities of greater than one year. These trades could not be centrally cleared as CCPs tend to only clear repo trades with maturities up to one year.

Third, there had been a structural increase in repo activity by non-banks with recently established repo operations. These non-banks are typically liability-driven investors, such as pension funds, which tend to hold long-dated collateral. When they deal bilaterally with clearing member banks they raise cash against that collateral. This may have left banks holding a higher proportion of long-dated collateral than in the past. Since CCPs require higher margins on long-dated collateral — for instance, LCH charges 8.7% margin for 30-year (or longer-dated) gilt collateral, as opposed to 1.7% for 3–7 year gilt collateral (irrespective of the term of the repo itself) — this may have induced banks to trade bilaterally with other banks, instead of via CCPs.

Policy implications

A widespread shift in repo activity away from CCPs and into the bilateral inter-dealer market could have negative financial stability implications. It entails a loss of transparency at a time when international efforts, including by the FSB, are under way to make this market less opaque.(1) In addition to the FSB consultation, European central banks are currently assessing the scope for an EU trade repository for securities financing transactions.(2)

International comparison

In the United States, most repo is thought to be done via tri-party arrangements. The Fixed Income Clearing Corporation (FICC) rules require clearing members to report any CCP-eligible trades transacted with other clearing members. This rule is thought to discourage bilateral inter-dealer repos to a certain extent.(3) In Europe, where there are multiple CCPs, there are no European-wide reporting rules, potentially making it easier for CCP-cleared trades to move into the bilateral inter-dealer market.

Outlook

Whether the trend towards conducting repo on a bilateral basis will persist is uncertain. On the one hand, contacts who expect the change to persist note that a number of the drivers outlined above were likely to be permanent — for instance, higher CCP default fund contributions and repo desks being charged more directly for margin costs. And provided that dealers continued to perceive counterparty credit risk to be low, and had already established bilateral netting infrastructure, they might not be prepared to pay CCP margin costs, even if they came down.

On the other hand, contacts identified factors which might incentivise banks to do more repo business via CCPs. First, if volatility in government bond markets retreats from historic highs, CCP margins should start to fall. Second, some contacts expected LCH's new margin model, which was expected to roll out in 2013, to reduce margin requirements for high-quality government bonds. And it is likely to remain the case that some banks will choose not to increase their inter-dealer repo activity, preferring instead to continue to use CCPs due to the benefits of reduced credit exposures via multilateral netting.

(1) See www.financialstabilityboard.org/publications/r_121118b.pdf.
(2) See www.ecb.int/press/key/date/2012/html/sp121203.en.html.
(3) See FICC *Government Securities Division Rulebook*, page 146, available at www.dtcc.com/legal/rules_proc/FICC-Government_Security_Division_Rulebook.pdf.

Research and analysis

The Funding for Lending Scheme

By Rohan Churm and Amar Radia of the Bank's Monetary Assessment and Strategy Division, Jeremy Leake of the Bank's Financial Institutions Division, Sylaja Srinivasan of the Bank's Statistics and Regulatory Data Division and Richard Whisker of the Bank's Sterling Markets Division.[1]

The Bank of England and HM Treasury launched the Funding for Lending Scheme (FLS) in order to encourage lending to households and companies. The FLS offers funding to banks and building societies for an extended period. And it encourages them to supply more credit by making more and cheaper funding available if they lend more. Easier access to bank credit should boost consumption and investment by households and businesses. In turn, increased economic activity should raise incomes. Early signs have been encouraging, as funding costs for UK banks have fallen sharply. But it will be some time before the impact of the FLS on lending is clear. The Bank is monitoring a range of indicators in order to assess the direct and indirect impacts of the Scheme.

Introduction

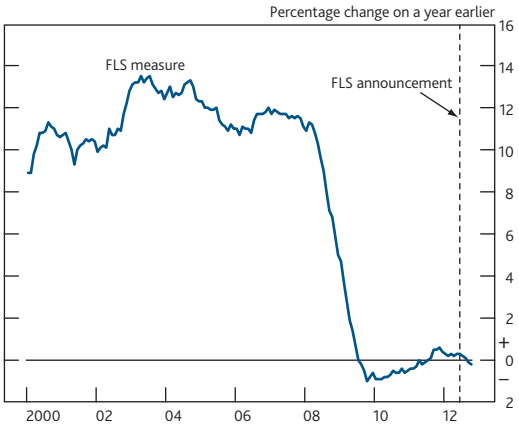
On 13 July 2012, the Bank of England and HM Treasury launched the Funding for Lending Scheme (FLS).[2] The FLS is designed to incentivise banks and building societies to boost their lending to UK households and private non-financial corporations (PNFCs) — the 'real economy'. It does this by providing funding to banks and building societies (hereafter 'banks')[3] for an extended period, at below market rates, with both the price and quantity of funding provided linked to their performance in lending to the UK real economy. This article explains how the FLS works and how it aims to provide additional stimulus to the economy. It is too early to see evidence of the Scheme's impact in full, and so evaluation of the success of the Scheme is left for a future publication.

Why was the FLS launched?

Since the start of the financial crisis, the Monetary Policy Committee (MPC) has provided substantial stimulus to the economy, first by cutting Bank Rate to 0.5% and then by purchasing £375 billion of assets as part of its programme known as quantitative easing (QE).[4] Despite this extremely accommodative stance of monetary policy, output has been broadly flat over the past two years. And prior to the announcement of the FLS, lending to UK households and PNFCs by banks had been broadly flat for over three years (**Chart 1**).

The weakness of bank lending reflects a range of factors, but one major determinant is the price that banks have to pay for funds. Over the twelve months to end-May 2012 — the period preceding the launch of the FLS — the intensification of the crisis in the euro area caused bank funding costs and, in turn, interest rates on loans, to increase (**Chart 2** shows an illustrative example). As changes in interest rates on loans typically follow changes in funding costs with a lag, a further tightening in credit conditions was in prospect.[5]

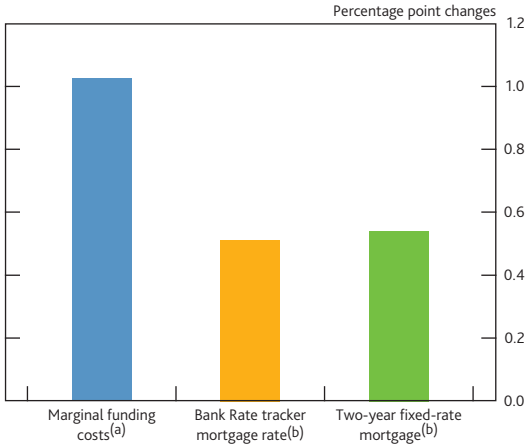
Chart 1 Lending to UK-resident households and businesses[a]



(a) Twelve-month rate of growth in the stock of lending. Lending to the UK-resident household sector and PNFCs. Non seasonally adjusted. See Appendix B for more details.

(1) The authors would like to thank Florence Hubert for her help in producing this article.
(2) The FLS was first announced by the Chancellor of the Exchequer and the Governor of the Bank of England on 14 June 2012. See King (2012). The Scheme opened for operation on 1 August 2012.
(3) The Scheme is open to all banks and building societies that sign up to the Bank's sterling facilities. Eligibility criteria for the Scheme are explained in Appendix A.
(4) Butt *et al* (2012) on pages 321–31 in this *Bulletin* describe what the money data can tell us about the impact of QE.
(5) For example, intelligence from the Bank of England's 2012 Q2 *Credit Conditions Survey* suggested that further increases in loan rates were expected prior to the announcement of the FLS.

Chart 2 Changes in indicators of bank funding costs and lending rates between 31 July 2011 and 31 May 2012



Source: FLS explanatory note, available at www.bankofengland.co.uk/markets/Documents/explanatory_notefls120713.pdf.

(a) The estimated marginal funding costs of extending variable-rate sterling-denominated loans. This is calculated as the sum of three-month Libor plus a weighted average of the five-year credit default swap (CDS) premia of the major UK lenders. Weights are based on banks' shares of new household secured lending. Marginal funding costs may vary across lenders.
(b) Rates for 75% loan to value mortgages.

High funding costs can result from uncertainty over the adequacy of bank capital, which is one reason why the Financial Policy Committee (FPC) has emphasised the need for banks to have sufficient capital. Given the heightened level of risk aversion associated with the intensification of the euro-area crisis, funding costs seemed likely to remain elevated and impair the flow of credit from banks to households and businesses for a considerable time. The FLS is a direct policy response to that threat to the UK economy posed by elevated bank funding costs. Funding costs are a key determinant of the interest rate banks charge on loans.(1) By reducing them, the FLS should lead to more and cheaper credit flowing into the economy than otherwise.

The next section explains the channels through which the FLS should boost the economy and how it complements the MPC's asset purchases. The third section explains in more detail how the FLS is designed to reduce banks' funding costs and increase their incentives to lend. The fourth section starts by considering some headwinds to lending and then discusses the factors that could determine the extent of the boost from the FLS relative to that counterfactual. The final section provides guidance on which indicators may show evidence of the FLS working at different stages of the transmission mechanism.

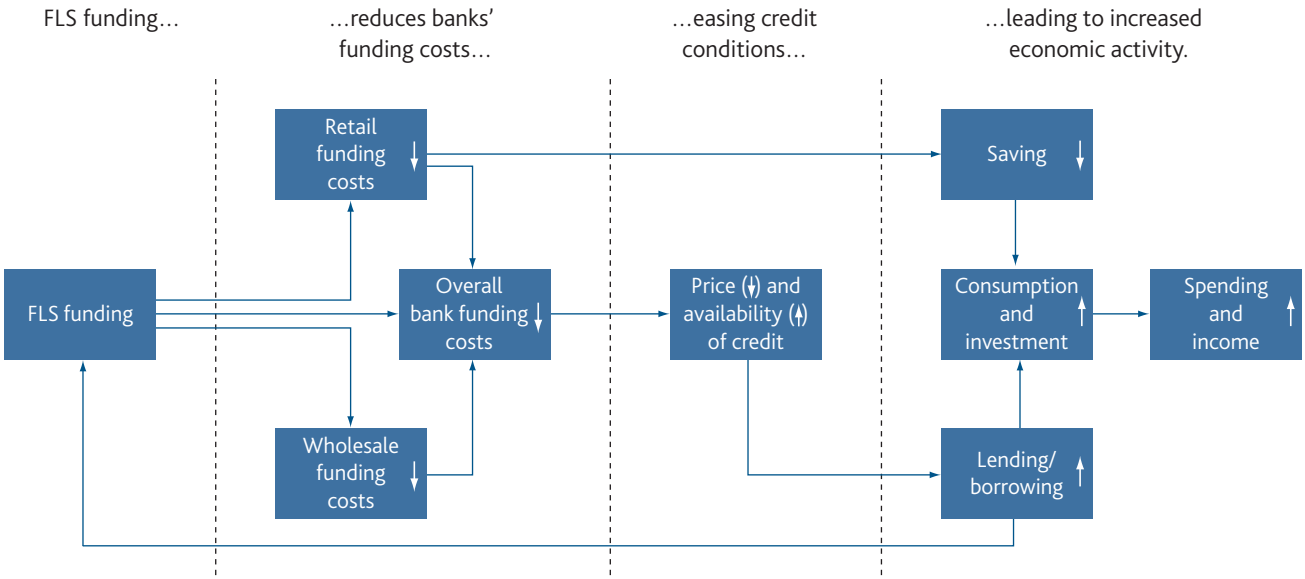
A box on page 311 explains how the incentive mechanisms embedded within the FLS work across different banks. Another box on pages 314–15 estimates the cost of funding via the FLS relative to other sources. Appendix A explains the mechanics of the operations of the FLS and Appendix B details the data and certification process used to allocate funding and set fees.

How will the FLS boost the economy?

A stylised overview of how the FLS should boost the economy — the transmission mechanism — is summarised in **Figure 1**. In order to extend loans, banks need funding. Normally, funding primarily comes from households and businesses — referred to in this article as *retail funding* — or from market investors in the form of *wholesale funding*. The higher the interest rates banks need to pay on that funding, the higher are the interest rates on loans they make to households and businesses, such as mortgages, personal and business loans. The FLS offers banks a cheap source of funding.(2) And this

(1) For a full explanation of the factors influencing the price of new lending see Button, Pezzini and Rossiter (2010).
(2) The FLS actually offers Treasury bills (rather than money) in exchange for collateral. Appendix A discusses how the Treasury bills can then be used to obtain funding.

Figure 1 Transmission mechanism of the FLS



may bring about a fall in the cost of the other sources of bank funding, for example by reducing the need for participating banks to issue debt in public markets. Together, lower overall bank funding costs should allow banks to increase the availability of credit by cutting loan rates or easing other, non-price terms.

The resultant increase in lending should be associated with higher consumption and investment spending. And under the design of the FLS, more lending allows banks to access additional cheap funding from the Bank, which in turn encourages further lending. Lower deposit rates offered by banks could also encourage households in aggregate to increase their consumption. In the longer term, if tight credit conditions have been holding back productivity growth, then the FLS could increase the supply potential of the economy (see the November 2012 *Inflation Report*).

The FLS and QE

Both the FLS and the MPC's asset purchases are intended to provide stimulus to the economy. By affecting different parts of the economy, the two policies complement one another.

When the MPC undertakes expansionary monetary policy — whether through conventional or unconventional means — it typically does so in response to ***generalised*** weakness in aggregate demand that might lead to inflation being below the 2% target in the medium term. Since the onset of the financial crisis, the MPC has injected substantial stimulus into the economy both through cutting Bank Rate and undertaking QE.(1) But, at the time that the FLS was introduced, higher funding costs were judged to be one of a number of major headwinds likely to continue to weigh on demand (see the May 2012 *Inflation Report*).

The FLS is a direct and targeted response to a ***specific*** headwind, namely the elevated level of funding costs facing UK banks following the intensification of the euro-area crisis. Notwithstanding the progress many UK banks had made in replenishing capital, a combination of elevated risk aversion and uncertainty about the value of banks' existing assets led investors to demand additional compensation to lend to them. This level of bank funding costs when the Scheme was introduced was greater than would have been warranted by the fundamental riskiness of new lending to the UK real economy alone. And these elevated funding costs were being passed on to UK real economy borrowers, impairing the flow of credit from banks to households and businesses.

In general, QE works by *circumventing* the banking sector by increasing the quantity of money held by the non-bank private sector. The main transmission channels are through increasing asset prices and reducing the cost of capital market issuance. Higher asset prices typically represent an increase in wealth for their owners. And portfolio balancing towards riskier assets could, for example, reduce the interest rates on new corporate bond issuance. QE should therefore benefit the owners of assets, and businesses who can issue debt or equity in capital markets. Households and companies dependent on bank finance are also affected by QE. But this impact is mainly indirect, via the impact on demand and incomes.(2)

In contrast, the FLS aims to reduce borrowing costs by going directly *through* the banking sector. For this reason the immediate beneficiaries are likely to be those who are reliant on banks as a source of finance. The FLS and QE can therefore be regarded as complements. Together, they should reduce the cost of finance through both banks and capital markets, benefiting the economy at large.

How does the FLS affect funding costs and the incentives to lend?

As shown in **Figure 1**, the FLS boosts banks' incentives to lend by making both the amount and price of funding available to banks conditional on their lending to the UK real economy. The following subsections set out how the amount and price of funding available to banks vary with their lending, and the role that non-FLS sources of funding play in the transmission mechanism.

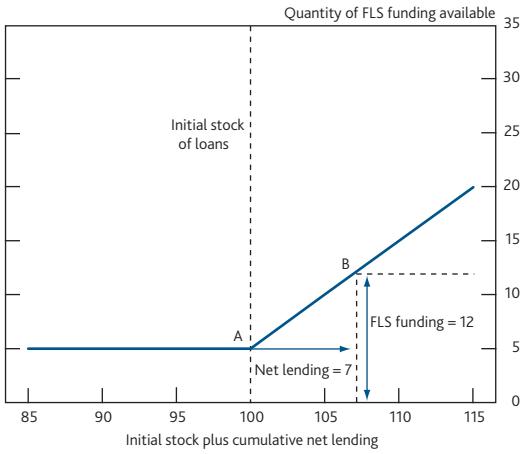
Quantity of funding available

The FLS offers a substantial amount of funding to banks. How the amount of FLS funding available varies with the amount a bank lends is shown in **Chart 3**. In order to create incentives for all banks to lend more than they otherwise would, the FLS offers an initial entitlement of discounted funding available to all banks, including those deleveraging, regardless of the evolution of their loan portfolios. At a minimum, each bank can borrow an initial amount of up to 5% of its stock of existing loans (as of June 2012) to the real economy (**Chart 3**).

There is no upper limit in the Scheme rules regarding the amount of funding that banks can access through the FLS, provided a participant has sufficient collateral. That is because banks are eligible to borrow additional funding equal to any positive **net** lending — new lending minus repayments — that they do during the 18 months from end-June 2012 to end-December 2013 (hereafter the 'reference period').(3) Netting off repayments is consistent with the objective of the FLS to boost the amount of credit to the UK real economy.(4) In other words, every pound of net lending to the real

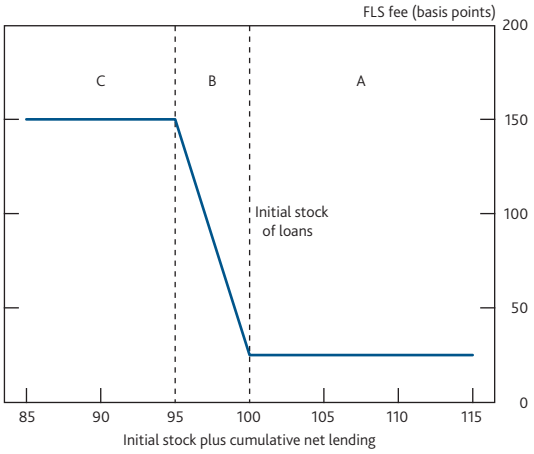
(1) See Benford *et al* (2009) for a full description of QE and its transmission mechanism.
(2) Insofar as banks' wholesale funding costs may fall as part of this process of portfolio rebalancing, there might be some reduction in the cost of bank credit. But this is not a key channel.
(3) For more details about how the funding is supplied to the banks see Appendix A.
(4) The net lending measure used excludes other actions that affect lending stocks, such as loan write-offs and sales and purchases of loans, as these leave unchanged the aggregate amount of credit provided to the economy. For more details on how the data is reported and certified see Appendix B.

Chart 3 How the quantity of available FLS funding varies with lending[a]



(a) All numbers are indexed relative to the initial stock of loans = 100.

Chart 4 Fee charged on FLS funding[a]



(a) All numbers are indexed relative to the initial stock of loans = 100.

economy during the reference period increases the amount that a bank is able to borrow by a pound, provided they have sufficient collateral.

For example, a bank that had a stock of lending to the real economy of £100 billion (point A on **Chart 3**) at the end of June 2012 would initially be entitled to £5 billion of funding. If that bank then lent a further £7 billion during the reference period, it would move to point B on **Chart 3** and be able to borrow a further £7 billion of funding, so £12 billion in total. As any net lending brings with it the possibility of an equal amount of additional cheap funding, the FLS embodies strong incentives to expand the supply of credit.

Price of funding

All borrowing from the FLS is at the lowest available fee for banks that expand lending. But banks that contract their net lending stock must pay more. **Chart 4** shows how the fee paid on the entire amount of FLS funding varies with the amount of lending a bank undertakes.(1) Specifically:

- Banks that maintain or expand their lending over the reference period pay a fee of 25 basis points per year — zone A in **Chart 4**. That implies a sizable discount in comparison to the price of both retail deposits and wholesale funding — the most likely alternative sources of funds — at the time that the FLS was launched.(2)

- Banks that contract their stock of loans by less than 5% pay an additional 25 basis points for each single percentage point fall in net lending — zone B in **Chart 4**. That fee increases linearly up to a maximum of 150 basis points. For example, a bank that had an initial stock of £100 billion, which fell by £3 billion (that is, 3%) over the reference period, would pay a fee of 100 basis points on up to £5 billion of FLS funding.

- Banks that contract their stock of loans by more than 5% pay the maximum fee of 150 basis points — zone C in **Chart 4**. The -5% threshold was set based on expectations for lending at the time the Scheme was launched, to make it likely that most, if not all, of the major UK banks would not fall into zone C by the end of the reference period.

Indirect effects on other bank funding costs

In addition to the direct effects on bank funding costs from the price and quantity of FLS funding, this extra source of funding may bring about a fall in the cost of *other* sources of bank funding. Importantly, these effects will likely be felt across the entire financial sector, so funding costs could fall even for institutions, including non-banks, that are not participating in the FLS.

These falls might come about because the funding available to banks through the FLS means that they will have a lower requirement for other sources of funding than otherwise. This could drive down the cost of those other funding sources, such as issuing term debt in wholesale markets. This 'portfolio balance' effect is similar to that which forms part of the transmission mechanism of quantitative easing (see Joyce, Tong and Woods (2011)).

The impact on banks' other funding costs is an important part of the transmission mechanism of the FLS. This is because when deciding the prices for all of their new loans banks may factor in the costs of all of their new funding. The amounts of new ***gross*** loans and new funding raised will typically be large relative to ***net*** balance sheet changes over any given period.

(1) For more details about how the fee is charged see Appendix A.
(2) The fee is not the only cost of funding for banks using FLS. Most obviously a bank would need to pay approximately Bank Rate to convert the Treasury bills into cash. For more details on other costs and a comparison with other funding sources see the box on pages 314–15.

That is because a bank will receive loan repayments from customers, and so will need to make new gross loans even to achieve zero net lending. Similarly, as a bank's liabilities mature a bank would need to raise new funding to keep the overall size of its balance sheet constant. And the FLS entitlement for any bank (5% of its initial lending stock plus any new net lending) will probably be less than its overall funding requirement during FLS reference period.(1) So overall funding costs faced by banks will therefore depend on both the cost of FLS funding as well as the cost of other liabilities.

Of course, each bank is in a different starting position, with different strategic objectives. In particular, prior to the announcement of the FLS, some banks were planning to reduce their lending overall, because of their capital and liquidity positions, or because of European Union state aid conditions.(2) The box on page 311 explains in detail how the price and quantity aspects of the FLS combine to increase incentives to lend for banks in different positions.

What might determine the effectiveness of the FLS and how will we monitor it?

The FLS should lead to more, and cheaper, credit flowing into the economy than otherwise. But the cost of funding through the FLS is only one of the factors determining the supply of credit to the real economy. Other supply factors — such as the response of other bank funding costs and the need for some banks to repair their balance sheets — will also affect the volume of loans extended, as will credit demand. This section first considers what the outlook for lending might have been without the FLS. It then moves on to what might determine the effectiveness of FLS and how this could be monitored.

Other factors affecting lending

A major challenge in assessing the impact of the FLS is that it is difficult to know what the likely evolution of credit conditions would have been in the absence of the Scheme — 'the counterfactual'. And it is possible that a range of unexpected developments will affect credit conditions over the 18-month FLS lending period. So it will be difficult to quantify the extent to which data reflect the realisation of the expected counterfactual, the impact of the FLS, or other factors.

The flow of lending is determined by the interaction of credit supply and credit demand. Since the onset of the 2008/09 recession, UK companies and households have collectively spent much less, relative to their incomes, than before. This has been associated with lower demand for credit as well as weaker supply. The uncertain economic outlook is likely to continue to inhibit demand for credit over the FLS lending period.

Prior to the announcement of the FLS, the outlook for the supply of credit was also weak. The rise in bank funding costs over the previous twelve months was judged likely to continue to impart upward pressure on new loan rates and cause credit conditions to tighten further. Lending to the UK real economy, which had been broadly flat for over three years, was projected to be more likely to decline than increase over the following 18 months.

Other factors may also inhibit credit supply. For example, banks may be unwilling to lend because they need to address weaknesses related to their business models or 'legacy' balance sheets that require them to strengthen their capital and liquidity positions. In the run-up to the financial crisis, the lending rate on some loans may have been too low given the risks taken, or the capital allocated to those loans may have been too low to absorb the potential losses from future borrower defaults. Perceptions of widespread forbearance(3) by banks on such loans, together with concerns that provisioning levels may be too low, may have contributed to doubts about the valuation of assets on banks' balance sheets. This could help explain some banks' low market capitalisation relative to the book value of their assets. Banks with the lowest market-based measures of capital have tended to be those with lower loan growth.(4)

The FLS should lower the price and increase the quantity of lending *relative to the counterfactual* that reflects all of these factors. So, for example, as interest rates on loans had been expected to increase, the FLS may have had the initial effect of preventing these rises, rather than causing immediate reductions in loan rates.

Over the period of the Scheme, both retail and wholesale funding costs will also be affected by a number of new developments, including other policy measures. For example, the announcement of the European Central Bank's (ECB's) Outright Monetary Transactions (OMTs) is likely to have increased investors' willingness to hold bank debt by alleviating some of the tail risks facing the European banking system. And bank funding costs have fallen across Europe since that announcement.

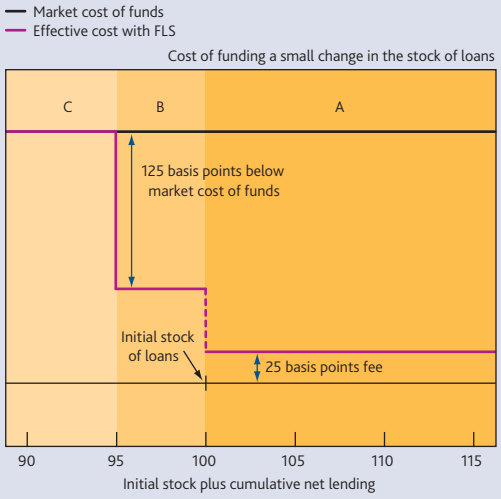
There have also been policy recommendations by the FPC, as well as some announcements from the Financial Services Authority (FSA). In November 2012, the FPC recommended that the FSA takes action to ensure that the capital of UK banks and building societies reflects a proper valuation of

(1) In addition, banks might be keen to continue to issue debt to the market in order to maintain their investor bases, not least because of the need to replace FLS funding in the future.
(2) See Fisher (2012) for more discussion.
(3) Forbearance occurs when banks temporarily provide borrowers with flexibility to meet their obligations during periods of distress. If provisioned for prudently, forbearance can be positive for financial stability and economic activity. For more information see pages 25–29 of the November 2012 *Financial Stability Report*.
(4) See Chart 2.19 on page 26 of the November 2012 *Financial Stability Report*.

How the FLS affects incentives for different banks

The major UK lenders each had different balance sheets and lending plans at the start of the Scheme. The incentives contained within the FLS are designed to have a positive effect across all banks. This box considers how both the price and quantity aspects of the FLS operate for banks that are expanding their lending, and banks that are deleveraging. Although the 'all-in' costs of funds described in the box on pages 314–15 matter, this box abstracts from those for simplicity. **Chart A** shows an illustrative example of the effective cost of funding a small change in net lending.

Chart A The effective cost of funding a small change in the stock of loans for different levels of net lending[a][b]



(a) Initial stock indexed to 100. Illustrative example, not to scale. The chart is drawn assuming a market cost of funds such that even a bank deleveraging 5% or more will find it cheapest to borrow their full entitlement from the FLS. The chart would vary given different assumptions about the market cost of funds. In particular it is not the case that the effective marginal cost of funding is always lower in zone A than zone B.
(b) The funding costs shown in this chart do not take account of the 'all-in' costs of funds discussed in the box on pages 314–15.

Case 1: for a bank expanding its lending

For a bank expanding its lending, the quantity aspect of the Scheme means that any expansion in net lending can be funded through the FLS. Therefore, for these banks, the *marginal source of funds* is the FLS, at a fee of 25 basis points (zone A in **Chart A**). The ability to access additional funds with new net lending therefore creates an incentive to expand lending further.

Case 2: for a bank deleveraging

For a bank shrinking its loan book, or deleveraging, the *quantity aspect* of the Scheme does not affect incentives to lend, as a bank's entitlement of FLS funding remains at 5% of its initial lending stock. If FLS funding is cheaper than the market cost of funding, it will be cheapest for a bank to take the full 5%, whatever the plans for net lending. The **marginal** source of funding for a bank considering whether to delever by less than planned is therefore retail or wholesale funding at the market rate (to the extent that the FLS puts downward pressure on the cost of other liabilities, as discussed earlier, this market rate will fall).

An important incentive to delever by less comes from the *price aspect* of the Scheme. This means that for net lending between -5% to 0% (zone B in **Chart A**) over the 18-month reference period, the less a bank delevers, the less they pay on their entire initial 5% entitlement. Specifically, the fee falls by 25 basis points per 1 percentage point of extra lending. In contrast to a bank expanding its lending (zone A in **Chart A**), for a bank that has negative net lending (zone B in **Chart A**), it is difficult to anticipate what the marginal funding cost is in absolute terms. But we can infer the marginal cost *relative to the prevailing market rate* (zone B in **Chart A**).

To see this, consider a bank which had an initial stock of £100 billion, and was planning gross lending of £3 billion less than expected repayments, reducing its stock to £97 billion. Such a bank would be entitled to £5 billion in FLS funding, reducing its reliance on market funding for the £97 billion stock of loans to £92 billion. At that point, increasing net lending by £1 billion (going from £97 billion to £98 billion) involves paying for £1 billion of funding at the market rate. But it also brings about a reduction in the cost of funds on the *entire £5 billion* from the FLS from 100 basis points to 75 basis points (see **Chart 4** in main text). So for every £1 billion of funding taken at the market rate, the price on the £5 billion of FLS funding — five times as much — falls by 25 basis points. Therefore the effective *marginal* cost of £1 billion of funding for lending between £95 billion and £100 billion is **125 basis points below the market rate**. The variation of the fee paid on the initial entitlement — the price aspect — therefore creates an incentive to deleverage less than otherwise would be the case. But for a bank deleveraging substantially (zone C in **Chart A**), the fee charged is flat at 150 basis points. The price aspect of the Scheme does not affect incentives to lend for banks in this zone.

their assets, a realistic assessment of future conduct costs and prudent calculation of risk weights. Where such action revealed that capital buffers needed to be strengthened to absorb losses and sustain credit availability in the event of stress, it said that the FSA should ensure that firms either raise capital or take steps to restructure their businesses and balance sheets in ways that do not hinder lending to the real economy.

The FSA had previously announced some additional measures, following the September 2012 FPC meeting, to ensure that the microprudential framework does not counteract an appropriate provision of lending.(1) For example, the FSA would make adjustments to the microprudential requirements to aim to ensure that no bank would be required to allocate additional capital to net new lending to households and companies.

As a result of building up their regulatory liquid asset buffers over the past two years, some banks held liquid assets well in excess of that indicated by the FSA's guidance. In June 2012, the FPC recommended that the FSA made clearer to banks that they were free to use their liquid asset buffers in the event of a liquidity stress. The FSA's subsequent actions reduced the incentives for banks to hold excessively large liquid asset buffers. Liquid assets held by the six largest UK banks have since fallen by £31 billion.(2) The funding used to support those liquid assets could be used to boost lending to the real economy. Alternatively, liquid assets sold to buy back expensive debt could boost profits and thus internal capital generation to support resilience and future lending.

The effectiveness of the FLS

The FLS should boost lending relative to the counterfactual discussed above. The rest of this section discusses some of the factors that might influence the form and size of that impetus. It also describes how Bank staff and the MPC will be able to monitor its impact.

From the FLS to bank funding costs

The FLS directly provides banks with a means by which they can fund at a discount relative to comparable market rates at the time it was introduced. The effectiveness of the FLS will partly depend on the extent of that discount relative to what those market rates would have been in its absence. As discussed above, this counterfactual path for market rates may change over time. For example, if there is positive news for the euro area, say, that leads to lower bank funding costs, then the *marginal* impact of the FLS is likely to be smaller, even though credit conditions would probably be easier. In an extreme case, bank funding costs could fall to the point where no bank would want to draw from the FLS. Although the FLS would then have no impact, this scenario would be very positive for lending relative to the situation prior to the introduction of the FLS, which would be a good outcome.

The FLS fee will depend on net lending. But comparing that fee by itself to indicators of other bank funding costs is likely to give a misleading steer on the relative cost of using the FLS. The true cost of any type of funding for a bank — the 'all-in cost' — takes into account a range of possible indirect costs involved with obtaining and making use of that type of funding, as well as the direct cost. The box on pages 314–15 attempts to quantify the extent of the discount on FLS funding by providing illustrative estimates of funding costs for the FLS and other sources of bank funding.

As previously discussed, the impact of the FLS on the price of other bank liabilities — both retail and wholesale funding — is an important determinant of its impact on overall bank funding costs. Movements in retail funding costs should be captured in the Bank's published series for first 'quoted' (advertised) and then 'effective' (paid) deposit interest rates. And there is a range of indicators of the cost of funding through various wholesale instruments, such as CDS premia and observed spreads on bank debt issued and traded in secondary markets. Monitoring these data could provide some indication of how the FLS has affected bank funding costs. Additionally, any falls in retail deposit rates — which represent the opportunity cost of consumption — could reflect the FLS having increased households' incentives to consume. Deposit rates also reflect the return on saving, and so, for some households, reduced interest income might lead them to reduce their consumption.

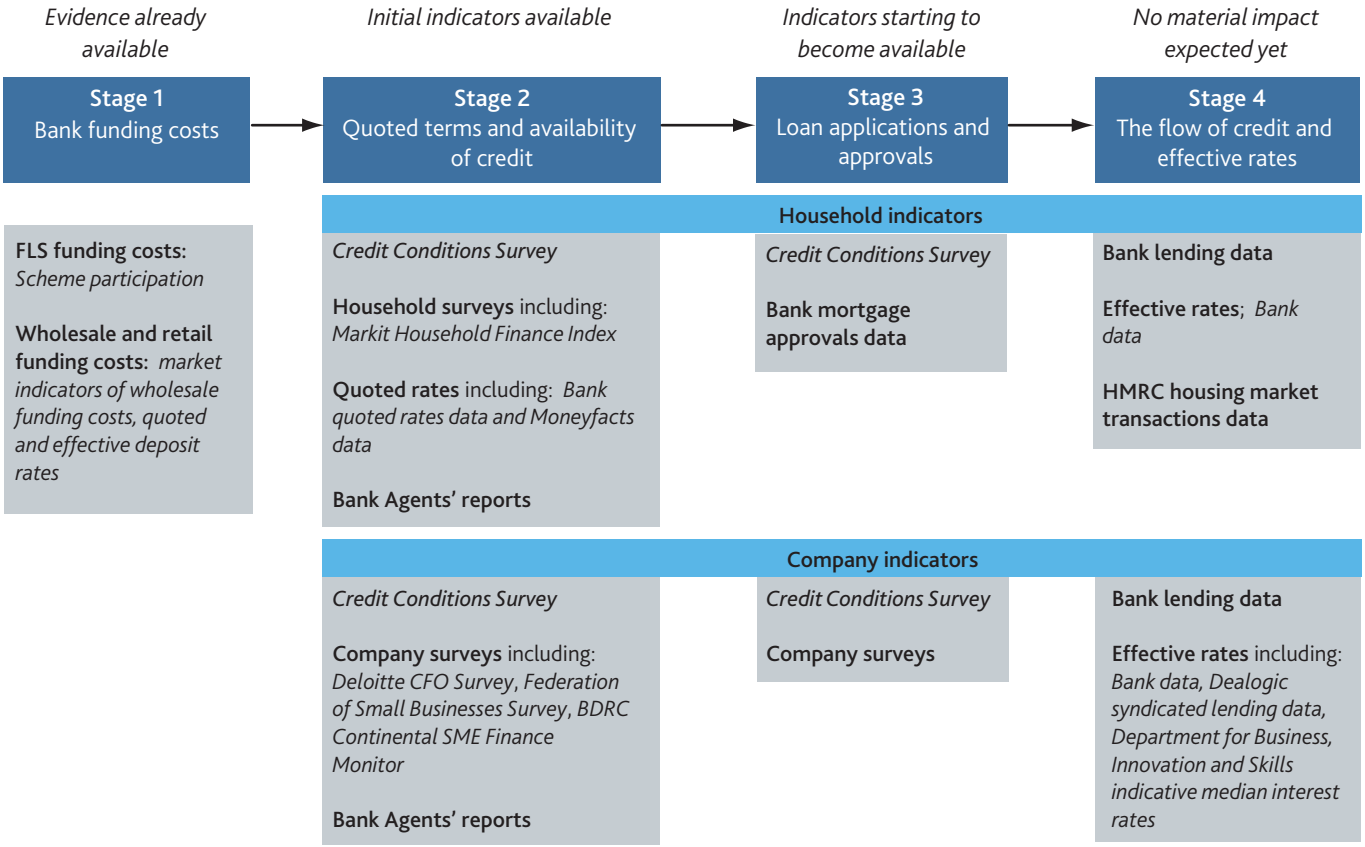
From bank funding costs to credit supply

Taken together, the extent of falls across all types of banks' funding costs will be an important factor influencing the price and availability of credit. Falls in funding costs that a bank experiences can be passed through to the interest rates it charges on loans. But the responsiveness of loan rates to the cost of funding is uncertain. Loan rates might respond more if large numbers of lenders participate in the FLS. But if legacy balance sheet weaknesses constrain some banks' ability to extend new credit then loan rates might respond less.

Rather than reduce loan rates by a uniform amount, banks might aim to maximise their profits by reducing the rates on some types of loans by more and others by less. For example, a bank may wish to target new borrowers to maximise the boost to net lending (and hence the banks' benefit from the Scheme). This means that movements in 'average' rates may not always be a sufficient description of the market. The Scheme will be more powerful if the products on which loan rates are cut the most account for significant volumes of lending.

(1) See www.fsa.gov.uk/library/communication/statements/2012/fpc.shtml.
(2) See also Chart 4.1 on page 49 of the November 2012 *Financial Stability Report*.

Figure 2 Stylised FLS transmission and selected indicators[a]



Source: Bank of England *Inflation Report*, November 2012.

(a) The listed indicators are a selection of the full range of indicators at each stage. Although it varies, the typical lag between a mortgage approval and transaction is two to four months. And it is probable that the lag from Stage 1 to Stage 4 will take longer for certain types of corporate lending.

Lenders may also choose to increase credit availability by loosening other, non-interest terms associated with loans. For example, banks may cut fees or loosen credit scoring criteria, or introduce new products. So the loosening of credit conditions resulting from the FLS may partly take place through the relaxation of these other terms of lending, rather than simply through the interest rate charged. Such 'non-price terms' of loans are more difficult to observe than interest rates. But surveys of both lenders and borrowers, including the *Credit Conditions Survey*, and intelligence from the Bank's network of Agents are able to provide some information.

From credit supply to the flow of credit

Increases in the supply of credit should result in increased volumes of lending to both households and companies. The extent depends on the responsiveness — or price elasticity — of loan demand to changes in the cost of credit. If borrowers desire a lot more credit as its price falls — that is, credit demand is 'price elastic' — then an increase in credit supply will cause a large increase in lending volumes. If, on the other hand, borrowers do not desire much more credit following a fall in its price — demand is less 'price elastic' — then lending will not increase by much. The elasticity of loan demand may vary over time, between households and companies, and for different types of loans to both households and companies.

Increases in lending quantities will first be reflected in the number of loan applications and approvals. Information on these is available from surveys. Once loan transactions take place, and drawdowns occur, they will be captured in lending quantities data published by the Bank, including the new measure of lending to households and businesses based on the FLS definition (see Appendix B for more details).

Evidence on the impact of the FLS so far

In addition to estimating the counterfactual, evaluating the impact of the FLS requires an understanding of the lags in the transmission mechanism of the Scheme. As discussed above, and in the November 2012 *Inflation Report*, a range of indicators — including advertised loan and deposit rates, lending volumes, and surveys of credit conditions — are likely to shed light on the FLS's effectiveness. But there are lags in the transmission, as summarised in **Figure 2**. And so it will be some time before its effects are seen in some data. For example, the FLS may lead to a reduction in mortgage rates. But there is typically a lag of two to four months between the mortgage agreement and the loan actually being drawn down. Given these lags on the household side, it seems unlikely that the FLS will materially affect mortgage lending volumes before early 2013, with the peak impact some time after that. And it

Comparing funding costs across various sources

When comparing funding costs across different sources of funding, including the FLS, it is important to consider all costs associated with raising funding via a particular instrument. This box outlines some of the costs associated with raising funding via wholesale instruments, and attempts to compare these to the FLS. Such calculations are highly uncertain and depend on the circumstances of each individual bank, but these estimates indicate that the FLS was around 200 basis points cheaper than other sources of wholesale funding at the time the FLS was announced. Given subsequent falls in market funding costs the FLS is now around 100 basis points cheaper.

For banks that are deleveraging and hence subject to a higher FLS fee, or banks that factor overcollateralisation costs into their funding cost calculations (see below), the relative attractiveness of the FLS would be reduced. But it is likely that for most banks the FLS provides an attractive source of funding. This is supported by anecdotal evidence from participants, including around planned usage of the FLS.

Direct costs

The direct cost of raising funding is the interest the bank must pay for that funding — for wholesale debt instruments, this is the coupon the issuing bank pays on the bonds. This represents the price the issuer must pay to compensate investors for, among other things, the credit risk of the issuer (that is, the risk that the issuer may not repay and the investors will lose their money). An indicator of the direct cost of raising funding via a particular debt instrument is given by the price at which such bonds are trading in the secondary market. In addition to the costs implied by these secondary market prices, in order to attract investors an issuer would typically have to pay a small 'new issue premium' to issue more debt to the market.

Indirect costs

There are various indirect costs associated with issuing debt instruments. These include the fees paid to the banks that arrange and underwrite the issuance, fees paid to register the bonds with the listing authority, and fees paid to ratings agencies to rate the debt. There are also legal costs associated with structuring a transaction and preparing the legal documentation setting out the terms and conditions of the bonds.

For covered bonds and residential mortgage-backed securities (RMBS) another indirect cost is the cost of the 'in-built' swaps that are typically required to convert the cash flows on the underlying receivables to more closely match the coupons payable on the bonds. For example, a typical pool of mortgages backing an RMBS will contain a mixture of fixed-rate and floating-rate mortgages, whereas RMBS typically pay just a floating-rate coupon. To mitigate the interest rate risk arising from this mismatch, the issuer will enter into an interest rate swap to convert the mortgage receipts into the floating-rate payments required on the bonds. Similarly, if the bonds are issued in a different currency to the underlying receivables, the issuer will enter into a cross-currency swap to address this mismatch. The cost of these swaps can be a significant component of the 'all-in' cost of raising funding via these sources.

FLS comparison

The headline cost for borrowing Treasury bills under the FLS is 25 basis points for banks that are not deleveraging. Compared to issuance of wholesale debt instruments, there are fewer types of indirect costs associated with the FLS. For example, there are no arranging, underwriting or listing fees. There are some legal costs, for example around the eligibility checking of loan collateral, but the largest indirect cost is likely to be the cost of converting the Treasury bills borrowed under the FLS into cash for lending.

One way a bank might do this is to use the Treasury bills as collateral to borrow cash in the market (a 'repo' transaction). Another option is for a bank to substitute the Treasury bills for reserves in its liquid asset buffer. In both cases, the cost of converting the Treasury bills into cash should be close to the expected path of Bank Rate over the life of the drawing.(1) Adding this cost to the headline cost for a non-deleveraging bank takes the approximate total cost of raising cash funding via the FLS to around 75 basis points.

It is difficult to compare the effective funding costs across different instruments given the range of factors involved, and differences in the funding costs faced by different banks. But **Table 1** provides some indicative estimates of these costs for different funding sources, including the FLS, averaging across UK banks. Based on these estimates, at the time the FLS was announced on 14 June 2012 it would have been around 200 basis points cheaper than using other sources of secured wholesale funding, such as RMBS or covered bonds. Given the recent substantial falls in UK bank wholesale funding costs(2) — which have been driven, in part, by the FLS itself — as at 26 November 2012 the FLS was likely to be around 100 basis points cheaper.

Overcollateralisation costs

The estimates of funding costs in **Table 1** do not include any consideration of collateral usage. Secured funding instruments need to be 'overcollateralised' — that is, more collateral must be provided than the quantity of funding secured on that collateral (analogous to mortgages requiring a loan to value ratio of less than 100%). This means that secured funding

Table 1 Indicative funding costs for major UK banks, excluding overcollateralisation costs

Basis points

Funding source	Direct costs[a]		Indirect costs[b]	Estimated total funding cost	
	14 June 2012	26 Nov. 2012		14 June 2012	26 Nov. 2012
Senior unsecured bonds	345	190	0	345	190
Covered bonds	240	140	30	270	170
RMBS	245	150	30	275	180
FLS	25	25	50	75	75

Sources: Bloomberg, Bank calculations and discussions with market participants.

(a) For senior unsecured bonds, covered bonds and RMBS the direct cost is an indicative estimate of the average cost of raising sterling funding at a maturity of around four years for major UK banks. For the FLS, the direct cost is assumed to be the 25 basis points FLS fee for a non-deleveraging bank.
(b) The indirect costs for senior unsecured bonds are assumed to be negligible in relation to the direct costs. The indirect costs for covered bonds and RMBS are indicative estimates based on discussions with market participants. The indirect costs for the FLS are assumed to be driven by the cost of converting FLS Treasury bills into cash, estimated at around 50 basis points based on the recent level of the four-year SONIA swap rate.

sources cannot be used to fund all of a bank's assets. And a desire to use collateral efficiently might also restrict a bank's willingness or ability to use its assets for secured funding.

Hence there may be an opportunity cost of using collateral, particularly if a bank has limited availability of collateral suitable for secured funding. Some — but not all — issuers take account of this when considering the cost associated with secured funding, including for the purpose of calculating the 'transfer price' that they internally charge different business units to fund their activities. An approach taken by some banks is to assume that the portion of collateral that is not funded by the secured funding is effectively funded by senior unsecured debt, which would increase the cost an issuer ascribes to using the secured funding source. For example, suppose a bank issues £100 of covered bonds at a price of 100 basis points, backed by a pool of £150 of mortgages. Ignoring other costs, if the bank assumes the £50 of overcollateralisation is effectively funded by senior unsecured debt at a cost of 200 basis points, say, the bank might consider the all-in cost of funding the pool of mortgages via covered bonds to be the weighted average of these costs, at 133 basis points.

The effective all-in costs of the secured funding sources (RMBS, covered bonds and the FLS) can therefore be higher than indicated in **Table 1**. The extent to which they might be higher depends, among other things, on the amount of overcollateralisation required for each source of funding. The haircuts applied to collateral in the FLS are likely to be at least as large as the haircuts applied to similar assets in market transactions, given the importance attached by the Bank to ensuring that its balance sheet is protected against loss in all but the most severely stressed of circumstances.[3] In some cases, this might make the FLS less attractive relative to other sources than the numbers in **Table 1** suggest. But that effect may be limited by the broad range of collateral accepted in the FLS, which includes some assets that may not be readily usable as collateral in market transactions and whose use as collateral therefore might not involve any opportunity cost. And even after any adjustment for overcollateralisation costs, the FLS is likely still to be an attractive source of funding for most banks.

(1) In the first case, this is because lending against Treasury bills is very low risk and so the rate for doing so should be close to the expected 'risk-free' rate. In the second case, the cost is the interest the bank foregoes on the reserves (that is, Bank Rate) that have been substituted for Treasury bills, on which FLS participants receive no interest.
(2) See the 'Markets and operations' article on pages 290–303 of this *Bulletin* for more information.
(3) See Fisher (2011) for more details on the Bank's policy on collateral.

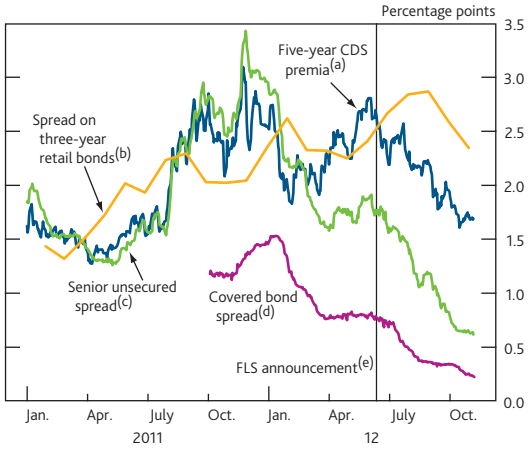
is probable that it will take longer for the effects from the FLS to feed through to certain types of corporate lending because many corporate loans are tailored to the customer, and so are less standardised than mortgage loans.

The rest of this section discusses some of the evidence on the transmission of the FLS so far. It suggests that the Scheme appears to have contributed to lower bank funding costs. There are early indications that it has begun to flow through into credit conditions, including falls in loan rates. The next stage might be a gradual pickup in mortgage approvals, although data on these can be volatile from month to month.

Participation in the Scheme is widespread. Thirty-five banking groups, comprising just over 80% of the stock of FLS eligible loans, had signed up by 3 December 2012. That translates into an initial entitlement of around £68 billion of funding. It was too early for the Scheme to affect net lending in 2012 Q3. And total real economy net lending was close to zero in that quarter. There was net lending of £7.6 billion, however, by those participating groups with positive net lending. That means that the total borrowing allowance increased to around £76 billion as of 3 December 2012, which demonstrates the incentives built into the Scheme. The borrowing allowance will continue to increase by one pound for every pound of additional net lending by banks expanding their loan books. By the end of September 2012, eight weeks into the Scheme, just over £4 billion in funding had been drawn from the FLS, and more has been drawn since.

As documented in the November 2012 *Inflation Report* and the minutes of the November MPC meeting, indicative measures of UK banks' longer-term funding spreads — both retail and wholesale — have fallen sharply since the announcement of the FLS (**Chart 5**). This is evidence of Stage 1 in **Figure 2**. In addition, shorter-term bank unsecured funding rates, including Libor, have also declined in recent months. These falls probably reflect, among other factors, both the impact of the FLS and other policy measures such as the ECB's announcement of its OMTs and the Bank of England's

Chart 5 UK banks' indicative longer-term funding spreads



Sources: Bank of England, Bloomberg, Markit Group Limited and Bank calculations.

(a) The data show an unweighted average of the five year CDS premia for the major UK lenders, which provides an indicator of the spread on long-term wholesale bonds.
(b) Sterling only. Spread over the relevant swap rate. The three-year retail bond rate is a weighted average of rates from banks and building societies within the Bank of England's normal quoted rate sample with products meeting the specific criteria (see www.bankofengland.co.uk/statistics/Pages/iadb/notesiadb/household_int.aspx).
(c) The data show an unweighted average of the spread between euro-denominated senior unsecured bonds and equivalent-maturity swap rates for a selected bond issued by each of the major UK lenders. The selected bonds have residual maturities of between two and six years.
(d) The data show an unweighted average of the spread between euro-denominated covered bonds and equivalent-maturity swap rates for a selected bond issued by each of the major UK lenders. The selected bonds have residual maturities of between three and seven years.
(e) The Lord Mayor's Banquet for Bankers and Merchants of the City of London at the Mansion House.

activation of the Extended Collateral Term Repo Facility.(1)(2) And the FLS will continue to provide a cushion against future fluctuations in market funding costs, for example if investor concerns about euro-area strains were to intensify again.

There is also evidence suggesting that the reduction in bank funding costs is beginning to feed through to the quoted terms and availability of credit (Stage 2 in **Figure 2**). Lenders reported in the 2012 Q3 *Credit Conditions Survey* that mortgage availability had increased markedly over the quarter. And lenders expected to increase availability further, and reduce spreads, in Q4. In general, quoted mortgage rates are no longer increasing(3) and for some products — for example fixed-rate mortgages — have begun to fall.(4) For companies, there is less concrete evidence of an easing in corporate conditions. A number of lenders have announced reductions in the cost of credit for companies, particularly smaller ones. These have taken the form of reductions in interest rates and fees, and the introduction of cash-back schemes on certain products.

Improved availability of credit should lead to greater loan approvals (Stage 3 in **Figure 2**), including in the Bank's mortgage approvals data. There is less information on corporate loan approvals. But in the November 2012 *Agents' summary of business conditions*, some lenders had recently begun to make offers of loans to smaller businesses at lower interest rates, although most companies' awareness of such improvements remained low. It will take some time for increased approvals to become transacted loans, so the FLS is unlikely to affect materially the flow of net lending (Stage 4 in **Figure 2**) until early 2013, and the lags are likely to be greater for certain types of corporate lending.

Conclusion

The Funding for Lending Scheme was introduced to counter the elevated level of bank funding costs prior to its announcement. The FLS offers banks a cheaper source of funding for an extended period. Cheap funding should feed into lower interest rates on loans to households and companies. Moreover, the Scheme encourages banks to increase lending by allowing them to borrow more funding at more attractive rates, the more they lend. An important part of the transmission mechanism of the FLS is the response of other bank funding costs. This reduction in the cost of bank finance should complement the reductions in the cost of capital market issuance caused by the MPC's asset purchases. Easier credit conditions should cause consumption and investment to increase, boosting economic activity.

But the cost of funds accessed through the FLS is likely to be just one of many influences on credit conditions over the next few years. And other factors such as balance sheet constraints facing banks, global macroeconomic developments, and credit demand, will also influence the effectiveness of the FLS.

The Bank will be monitoring a range of indicators in order to assess the impact of the FLS. But the difficulty of knowing the counterfactual — a challenge common to most policy evaluation — makes that task difficult. And there are likely to be sizable and variable lags in the transmission mechanism, meaning that evidence of the FLS's impact will only show in the data over time. There will therefore be considerable uncertainty in gauging the size of the boost to the economy delivered by the FLS. Nonetheless, early indicators suggest that the transmission mechanism of the FLS is working as expected so far.

(1) For more information on the Extended Collateral Term Repo Facility, see www.bankofengland.co.uk/markets/Pages/money/ectr/index.aspx.
(2) As discussed in the 'Markets and operations' article on pages 290–303 of this *Bulletin*.
(3) They had been rising since the middle of 2011 and had been expected to rise further prior to the announcement of the Scheme.
(4) See page 16 and Chart 1.11 in the November 2012 *Inflation Report*.

Appendix A
The operation of the FLS

This appendix outlines how the FLS operates in practice.(1)

Eligibility to participate

Institutions eligible to participate are banks and building societies that are signed up to the Bank's Discount Window Facility (DWF). All deposit-taking institutions are eligible to apply to join the DWF.

The FLS has been designed to support the UK economy, not the banks. Nevertheless, the Bank had to build the FLS on the existing structure of the Sterling Monetary Framework (SMF), and so eligibility is restricted to deposit-taking institutions. This ensures that the Bank has effective operational links with counterparties in both banking transactions and collateral positioning. It also ensures that the Bank can rely on the procedures and safeguards provided by the existing statutory data reporting requirements for banks and building societies in collecting the lending data on which FLS access is based. See Appendix B for more details.

To the extent that the FLS is successful at reducing funding costs and improving the economic outlook in general, even non-participants should benefit indirectly from the Scheme.

FLS transactions

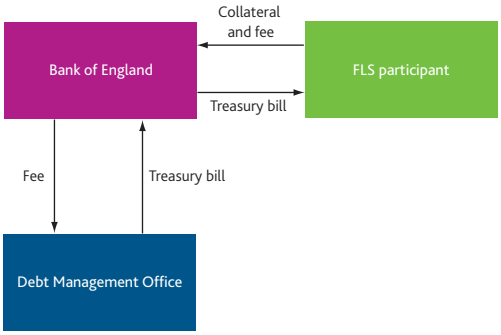
Under the FLS, participants can borrow UK Treasury bills in exchange for eligible collateral. Technically, FLS transactions are structured as collateralised stock lending transactions. Drawdowns under the FLS may be undertaken on each business day during the 18-month drawdown window running from 1 August 2012 to 31 January 2014 by contacting the Bank's Sterling Markets Desk. The term of borrowing is four years from the date of drawdown, but participants may repay their drawings, in part or in full, at any time.

Treasury bills

FLS participants might use the Treasury bills obtained from the Scheme to raise cash in a number of ways. One option is to use the Treasury bills as collateral to borrow cash on a secured basis in the market. Alternatively, counterparties may use the Treasury bills as collateral to borrow cash in the Bank's open market operations. Another option is for participants to retain the Treasury bills and substitute them for reserves in their liquid asset buffer.

The Treasury bills used in the FLS are issued by the Debt Management Office (DMO) specifically for the Scheme. They are liabilities of the National Loan Fund and held by the DMO as retained assets on the Debt Management Account. The Bank borrows the Treasury bills from the DMO under an uncollateralised stock lending agreement (**Figure A1**), and pays the DMO a fee to cover administrative costs.

Figure A1 FLS transaction structure



The Treasury bills have a maturity of nine months. The Treasury bills therefore need to be 'rolled' during the life of an FLS transaction, whereby the participant returns the maturing Treasury bills to the Bank in a window between 10 and 20 days prior to maturity. The Bank returns these Treasury bills to the DMO in exchange for new Treasury bills, which the Bank in turn gives to the participant on the same day.

The structure of FLS transactions and the operational processes around the Treasury bills are very similar to those in the Special Liquidity Scheme,(2) and so many of the Bank's counterparties are already familiar with these processes.

As stock lending transactions, FLS transactions do not appear directly on the Bank's balance sheet, although the Bank publishes quarterly details of the quantity of Treasury bills borrowed under the FLS.(3)

Eligible collateral

A broad range of collateral is eligible for use in the FLS, so that, as far as possible, the availability of collateral does not constrain banks' ability to use the FLS. Therefore eligible collateral in the FLS comprises all collateral that is eligible in the DWF. This includes portfolios of loans, various forms of asset-backed securities and covered bonds, and sovereign and central bank debt.(4) Eligible collateral must be pre-positioned with the Bank in advance of a drawing, so that the Bank is able to analyse the collateral and determine its value.

There is no mechanical link between new loans made by participants and the collateral that can be provided to the Bank. Participants can apply to use newly generated loans as collateral in the FLS if they wish, but equally participants can use any eligible assets already on their balance sheet. The sole purpose of taking collateral in the FLS is to protect the Bank from the risk of loss in the event that a participant defaults.

(1) For more details of how the FLS operates, see www.bankofengland.co.uk/markets/Pages/FLS/documentation.aspx.
(2) For more details on the Special Liquidity Scheme, see www.bankofengland.co.uk/publications/Documents/quarterlybulletin/qb120105.pdf.
(3) For more details on the data published on the FLS, see www.bankofengland.co.uk/markets/Pages/FLS/data.aspx.
(4) For more details on collateral eligibility, see www.bankofengland.co.uk/markets/Pages/money/eligiblecollateral.aspx.

The haircuts that apply to collateral in the FLS are the same as those that apply to collateral taken in the Bank's SMF operations, and are designed to protect the Bank's balance sheet against losses in all but the most severely stressed of circumstances.(1)

Borrowing allowance and fee

The quantity and price of funding available from the FLS is linked to participants' performance in lending to the UK non-financial economy, as discussed earlier.

The fee charged applies on drawings up to the FLS Group's borrowing allowance. If, on any day, an FLS Group's outstanding drawings exceed its borrowing allowance (for example, if an FLS Group's borrowing allowance has fallen following a reduction in lending, but the FLS Group has drawn up to the maximum amount of a previous higher borrowing allowance), no further drawings will be permitted until the borrowing allowance has increased above the aggregate drawing amount. Any such 'excess' drawings will not be clawed back, but the fee on the excess portion will be 150 basis points per annum.

During the drawdown window and up to 31 March 2014 participants pay a flat fee of 25 basis points per annum, quarterly in arrears. Once the drawdown window has closed and the final fee has been determined, any fee above the 25 basis points already paid is then charged as a lump sum. From then onwards, each participant pays its final fee on its outstanding drawings, quarterly in arrears, until they are repaid.

(1) For details on the Bank's approach to collateral risk management, see www.bankofengland.co.uk/publications/Documents/quarterlybulletin/qb100201.pdf.

Appendix B
Lending data reporting and certification

A key aspect of the operations of the FLS is the certification of the lending data. It is important that the data, on which the borrowing allowance is based, are in all material aspects accurate and complete. This section provides details on the FLS definition of lending and the certification procedure.

As indicated earlier, the quantity and price of funding available via the FLS will be based on the quantity of sterling loans made by a participant's FLS Group to UK-resident households and private non-financial corporations (PNFCs). The borrowing allowance for each FLS Group thus depends on their 'base stock' plus any positive cumulative net lending to the real economy during the reference period. The data that determine the base stock and net lending are provided and certified by the FLS Group via Form FL.(1)

The Bank requires a 'Form FL Certificate' (front sheet of Form FL) to confirm that the data provided in Form FL are accurate and complete. Each Form FL certificate must be signed by a banking group board member, such as the finance director or chief operating officer. Each entity in an FLS Group may choose to either certify individually, or alternatively, one entity may certify on behalf of the FLS Group. One reason for this pragmatic approach to certification is to accommodate different banking group structures across reporting institutions. While data certification may be done at the level of the FLS Group, the lending data are provided by each entity separately.

The FLS lending measure covers sterling loans to UK-resident households and PNFCs and is in the form of drawn loans. Participants' holdings of securities, commercial paper, bills and acceptances are not included. In aggregate, across the entire reporting population, the annual rate of growth in the stock of lending, using the FLS lending measure, is broadly similar to existing measures of lending such as M4 lending to households and PNFCs. More details on the comparison between the FLS lending measure and M4 lending are provided in Table 2 in the box on pages 7–9 in the October 2012 *Trends in Lending*.

The exact instruments used in the FLS definition of lending to the household sector and PNFCs — for example, loans and advances secured on dwellings and overdrafts — are provided on pages 1–2 of the *Form FL Guidelines* document.(2) They correspond closely with the instruments and definitions used in existing measures of lending published by the Bank which are derived from the Bank's statistical returns (Forms BE, BT, MM and MQ). This allows for the certified data on Form FL to be reviewed. The broad alignment of the FLS lending definition to existing definitions of lending means that the compilation of Form FL for participants is not cumbersome as the data and definitions are already being used in the compilation of the statistical returns. In addition, classification and definitional guidelines for Bank of England statistical returns are available on the Bank's website making the related FLS definition of lending more transparent and accessible.

The FLS Group consists of all monetary financial institutions (that is, banks and building societies) and specialist mortgage lenders within a Group that are required to report statistical lending data to the Bank. Net lending profiles of individual entities within the FLS Group can be different over the period of the Scheme — it is the net lending across the entire FLS Group that will determine the additional borrowing allowance and fee.

Participants are required to submit Form FL at least quarterly and, subject to the Bank's agreement, may choose to submit more frequently. The data provided in Form FL include the amount of relevant loans outstanding at the end of the previous calendar quarter (for example, 30 September 2012 for 2012 Q4 reporting) and at the end of the latest calendar quarter (for example, 31 December 2012) and net lending in the calendar quarter (for example 1 October to 31 December 2012). The lending data to be reported for the first certification (for 'base stock' as at 30 June 2012) and the process for the last certification (for data as at 31 December 2013) are different. More details are provided in Section 4.4 of the FLS Operating Procedures.(3)

The Bank is publishing quarterly data for each Group participating in the FLS. This includes the amount borrowed from the Bank, the net quarterly flows of lending to UK households and businesses, and the stock of loans as at 30 June 2012.(4)

(1) Form FL is available at www.bankofengland.co.uk/markets/documents/flsformfl_2.xlsx.
(2) The *Form FL Guidelines* document is available at www.bankofengland.co.uk/markets/documents/flsformflguidelines.pdf.
(3) See www.bankofengland.co.uk/markets/documents/flsopprocedures.pdf. More generally, Section 4 in this document provides information on the data reporting and certification process.
(4) FLS data are available at www.bankofengland.co.uk/markets/Pages/FLS/data.aspx. The publication timetable is available at www.bankofengland.co.uk/markets/documents/FLSpubdates.pdf.

References

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.

Butt, N, Domit, S, Kirkham, L, McLeay, M and Thomas, R (2012), 'What can the money data tell us about the impact of QE?', *Bank of England Quarterly Bulletin*, Vol. 52, No. 4, pages 321–31.

Button, R, Pezzini, S and Rossiter, N (2010), 'Understanding the price of new lending to households', *Bank of England Quarterly Bulletin*, Vol. 50, No. 3, pages 172–82.

Fisher, P (2011), 'Central bank policy on collateral', available at www.bankofengland.co.uk/publications/Documents/speeches/2011/speech491.pdf.

Fisher, P (2012), 'Developments in financial markets, monetary and macroprudential policy', available at www.bankofengland.co.uk/publications/Documents/speeches/2012/speech602.pdf.

Joyce, M, Tong, M and Woods, R (2011), 'The United Kingdom's quantitative easing policy: design, operation and impact', *Bank of England Quarterly Bulletin*, Vol. 51, No. 3, pages 200–12.

King, M (2012), Speech at the Lord Mayor's Banquet for Bankers and Merchants of the City of London at the Mansion House, available at www.bankofengland.co.uk/publications/Documents/speeches/2012/speech587.pdf.

What can the money data tell us about the impact of QE?

By Nicholas Butt, Sílvia Domit, Michael McLeay and Ryland Thomas of the Bank's Monetary Assessment and Strategy Division and Lewis Kirkham of the Bank's Statistics and Regulatory Data Division.

This article reviews the main influences on broad money growth since the onset of the global crisis, focusing on the impact of the Monetary Policy Committee's asset purchase programme (QE). The underlying weakness in money growth is likely to have reflected a combination of reduced nominal demand and a restructuring of banks' balance sheets. QE has played a key role in offsetting some of this weakness and in a way that has not depended on an increase in bank lending. The first two rounds of QE seem to have had a similar proportionate impact on the money supply, but there is some evidence that the transmission mechanism of QE may have been different over the two episodes.

Introduction

Movements in broad money can be informative about current and future spending in the economy and are an important indicator of inflationary pressure. They can also be useful in assessing the transmission of policies that directly increase the money supply, such as the asset purchases conducted by the Bank of England (also known as 'quantitative easing' or QE) on behalf of the Monetary Policy Committee (MPC). For QE to work, the broad money created by asset purchases should flow through to households and companies and help finance a higher level of spending in the economy.(1) That means broad money can be used, alongside other indicators such as financial yields and prices, to assess the effectiveness of QE.(2)

Broad money growth was weak from the onset of the global financial crisis in 2008 to the middle of 2012. The previous time the rate of money growth was so persistently low was in the 1950s (**Chart 1**). This weakness in broad money growth has happened in spite of significant monetary stimulus: Bank Rate was reduced to 0.5% in March 2009 — the lowest level in its 318-year history — and has remained there ever since; and, between March 2009 and May 2012, the MPC undertook £325 billion worth of asset purchases. Since then, the MPC has expanded its asset purchase programme by a further £50 billion and broad money growth has picked up to an annual rate of around 4%. This latter period is not covered in this article. Instead the focus is on explaining the earlier weakness of broad money.

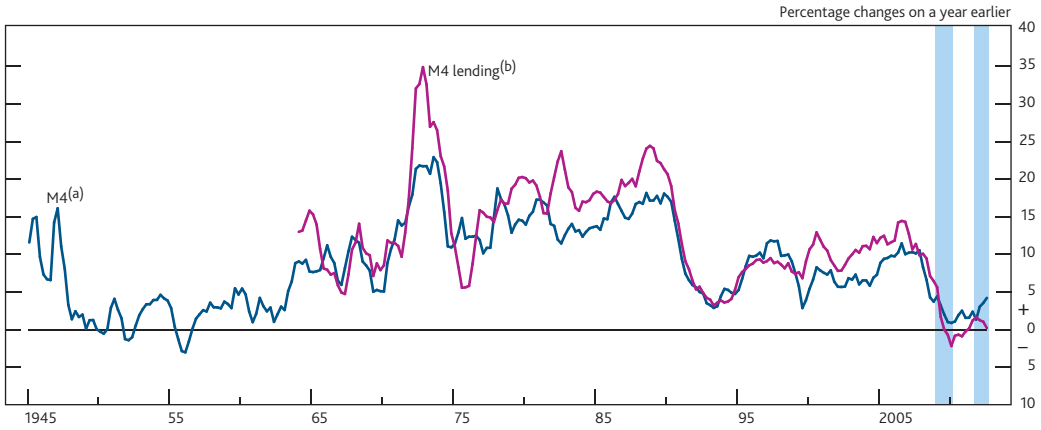
Normally broad money increases when banks(3) lend more to companies and households. But lending growth has been even weaker than money growth since 2009. The recent strength of broad money growth relative to lending growth over the recent past has been unusual. Over the past 30 years, lending growth has typically more than accounted for the increase in broad money. Given the underlying weakness in lending, QE was designed to increase the supply of broad money directly. It does not necessarily lead to (or require) a positive impact on bank lending for it to work. So an increase in broad money relative to bank lending might be one indicator that the transmission mechanism of QE is operating in the expected way.

Previous analyses investigated the weakness in broad money growth between the start of the recession in 2008 and the end of 2010.(4) They concluded that weak broad money growth could be explained by reduced nominal spending and the balance sheet repair carried out by companies and banks. These effects were very large, and were only partly offset by the positive impact from the first round of asset purchases ('QE1').

This article focuses on the weakness in broad money since the start of 2011 during which the second round of asset purchases ('QE2') took place. By lowering the yields on gilts and other assets, QE is likely to have induced other financial market transactions which, in turn, affect how much asset purchases feed in to broad money flows. The analysis in this article suggests that the impact of QE2 looks similar to QE1 — scaled

(1) See Benford *et al* (2009) and Bridges and Thomas (2012).
(2) See Joyce, Tong and Woods (2011) for a discussion of the various methods for assessing the effectiveness of QE.
(3) Throughout this article monetary and financial institutions which form the basis of the standard M4 and M4 lending definitions and include banks and building societies, are referred to as 'banks'.
(4) See Bridges, Rossiter and Thomas (2011) and Bridges and Thomas (2012).

Chart 1 Broad money and lending growth since 1945



Sources: Bank of England, Capie and Webber (1985) and Hills, Thomas and Dimsdale (2010). In this and subsequent charts the blue shaded areas represent periods of MPC asset purchases (QE) unless otherwise stated.

(a) M3 1945–63, M4 1963–98, M4 excluding intermediate 'other financial corporations' (IOFCs) 1998–2012.
(b) M4 lending 1963–98, M4 lending excluding IOFCs 1998–2012. Data are adjusted to exclude the impact of securitisations and loan transfers.

by the amount of gilts purchased — in terms of its effect on broad money and the wider economy.

The remainder of this article is organised into two sections. The first section reviews the key factors that are likely to have driven broad money growth since 2009, focusing particularly on the impact of QE. The second quantifies the impact of these factors using a money accounting framework (which is explained in a box on page 324). It compares the QE1 and QE2 periods and discusses what this tells us about the monetary impact of QE in both episodes, as well as the 'underlying' evolution of broad money in the absence of QE. A box on pages 328–29 puts these in perspective by analysing the behaviour of disaggregated money holdings over recent years. And a box on page 326 discusses the relationship between QE and bank lending.

Broad money and QE

The supply of broad money is determined by transactions between the banking sector (including the central bank) and the non-bank private sector (non-bank companies and households).(1) The most important of these transactions has tended to be the provision of credit by the banking sector to the non-bank private sector, which automatically creates a deposit (either for the borrower or for the recipient of the borrower's expenditure). But, in general, any transaction between the banking sector and the non-bank private sector will involve the creation or destruction of bank deposits and so will affect the supply of broad money. That includes the MPC's asset purchases.(2)

There have been three rounds of asset purchases since the launch of the programme. 'QE1' refers to the first £200 billion of assets, purchased between March 2009 and January 2010. These were followed by an additional £125 billion of assets purchased during 'QE2' between October 2011 and May 2012. A third round ('QE3') was announced in July 2012 but, as noted earlier, is not covered in this article. The MPC's asset purchase programme has been a key driver of broad money in recent years. To examine this impact, it is useful to distinguish between its direct and indirect effects.

The direct effect of asset purchases on money

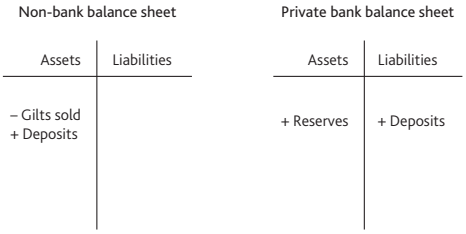
Asset purchases directly increase broad money if they boost deposits held by the UK non-bank private sector in banks and building societies. **Figure 1** illustrates how asset purchases by the Asset Purchase Facility (APF)(3) affect the balance sheets of the non-bank private sector (from whom it is likely that most of the purchases have been made)(4) and of private banks. The non-bank private sector executes these transactions via the Bank of England's counterparties, who are mostly banks:(5) they sell gilts to banks and their deposit accounts are credited with the proceeds from the sale. In turn, these banks sell gilts to the APF and their accounts are credited with reserves. So the direct impact of QE involves an increase in reserves on the asset side of the banking system's balance sheet and an increase in deposits — broad money — on the liability side.

The indirect effect of asset purchases on money: portfolio rebalancing

A key channel through which QE affects *the economy* is by kick-starting a chain of transactions — 'portfolio rebalancing' — that reduce the cost of borrowing in capital markets and

(1) Broad money is the sum of the sterling notes and coins and the sterling bank and building society deposits held by the UK non-bank private sector. See Burgess and Janssen (2007) for more information.
(2) For further discussion, see Bridges, Rossiter and Thomas (2011).
(3) QE purchases have been implemented through the Asset Purchase Facility, which obtains loans from the Bank of England with which to buy the assets. See Benford *et al* (2009) for more detail.
(4) As is shown later in **Chart 3**, the non-bank private sector sold gilts during QE1 and QE2 when they would have been expected to have been net purchasers given public sector debt issuance over this period. See Bridges, Rossiter and Thomas (2011) for more discussion.
(5) The Bank of England's APF gilt operation counterparties are henceforth referred to as banks.

Figure 1 QE and the direct effects on broad money



boost asset prices and nominal spending. This occurs because the ultimate (non-bank private sector) investors who sell gilts to the APF are likely to view the bank deposits they receive in exchange as a poor substitute for those gilts. As a result, they are likely to reinvest these proceeds into riskier assets that offer a higher return, such as corporate bonds and equities, causing the prices of those assets to rise and their yields to fall.(1) Spending in the economy then rises as companies respond to the lower cost of borrowing in capital markets and both companies and households react to higher asset prices, which increase the value of their financial asset holdings.

This portfolio rebalancing can also have an indirect impact on *broad money*, depending on how investors choose to reinvest the proceeds from their asset sales. Although a large part of the money created by QE may just circulate within the non-bank private sector, **the effect of QE on gilt and other financial market yields might induce certain transactions which can effectively 'destroy' some of the money created by the gilts purchased by the APF**. In this article, these transactions are referred to as 'leakages'. Some of them are discussed below.

- First, investors may choose to invest in corporate debt or equity, resulting in ***corporate substitution from bank loans to capital market finance***. As yields on corporate debt fall and equity prices rise, this would lower the cost of borrowing for companies in capital markets. That may encourage corporates to use this cheaper source of funding to repay existing loans from banks, thus reducing the level of bank lending in the economy.(2) The non-bank purchasers of corporate debt and equity would ultimately have to pay for this by reducing their deposits with banks, reducing the supply of money.

- Second, investors may make ***purchases of debt and equity issued by banks***. Higher prices and lower yields on bank-issued debt and equity might lead to lower funding costs for banks and increased lending in the long run. But increased bond and equity issuance by banks would reduce the money supply in the short run, as the domestic purchasers of bank bonds and equities would ultimately have to pay for these by lowering their deposits with the UK banking system. This would be reflected in a shift between deposit and non-deposit instruments on the liability side of banks' balance sheets.

- Third, portfolio rebalancing by banks themselves may lead to ***bank sales of government debt***. As yields fall (and prices rise) on gilts, banks may be induced to change the composition of their liquid asset holdings. If banks sell gilts to the non-bank private sector, this will increase non-bank private sector gilt holdings and, in aggregate, draw down their deposits, reducing the supply of money.(3)

- Fourth, investors may make ***purchases of assets from overseas residents***. This would reduce the deposits of UK residents (which are counted in the headline measure of broad money, $M4^{ex}$)(4) and increase overseas residents' deposits (which are not included in $M4^{ex}$). So the overall stock of deposits on banks' balance sheets would be unchanged but the headline measure of broad money would be reduced.

In summary, the overall impact of QE on broad money is a combination of the direct effect, and the indirect effects that arise from portfolio rebalancing.

Of course, factors other than QE have also affected broad money growth in recent years. The banking system's efforts to repair its balance sheet by improving its capital, funding and liquidity positions (over and above the effects that may have been induced by QE) may have had an impact on broad money, in both directions (see Bridges, Rossiter and Thomas (2011)). And the weakness in underlying nominal spending and the associated tightening in bank credit conditions (see Bell and Young (2010)) would also have been expected to lead to weak underlying credit and money growth over the recent past. These other factors determine the 'underlying' or 'counterfactual' path for broad money that would have been expected in the absence of QE.

In the next section an attempt is made to quantify and compare the direct and indirect effects of QE1 and QE2 on broad money. These then imply an underlying path for broad money that would have occurred in the absence of asset purchases. The plausibility of this 'counterfactual' is then assessed using various metrics.

How much of broad money growth can be accounted for by QE?

A useful starting point for quantifying the monetary impact of QE is to examine the balance sheet counterparts of broad

(1) This 'hot potato' mechanism is discussed in more detail in Bridges and Thomas (2012).
(2) It is worth noting that while this would reduce lending and thus change the composition of firms' financing, total finance raised by companies, which includes issuance of debt and equity, would not necessarily be affected. The box on page 326 discusses how QE could affect bank lending.
(3) So far, this assumes that all purchases of gilts by the APF are from the non-bank private sector. But this channel would also operate if initial APF purchases of gilts were from banks, rather than the non-bank private sector.
(4) M4 excluding intermediate 'other financial corporations'. See Burgess and Janssen (2007) for more details.

The counterparts framework for analysis of changes in broad money

In order to understand movements in broad money supply, it is useful to view them in the context of the balance sheet of the UK banking sector (see **Table 1**), drawing on the identity that total assets must equal total liabilities. Specifically, examining changes in the counterparts to broad money can help with interpreting a given change in broad money growth.

Table 1 Components of the balance sheet for the UK banking sector[a][b]

Assets	Liabilities
Lending ($M4Lx^{ex}$)	Broad money ($M4^{ex}$)
Sterling loans to IOFCs	Sterling deposits of IOFCs
Sterling lending to non-residents	Sterling deposits of non-residents
Sterling lending to the public sector	Sterling deposits of the public sector
Other sterling assets	Other sterling liabilities
Foreign currency assets	Foreign currency liabilities

(a) UK banking sector includes the central bank.
(b) Lending ($M4Lx^{ex}$) and broad money ($M4^{ex}$) are defined as M4 lending and M4 excluding IOFCs.

Broad money, which principally includes notes and coins in circulation and bank deposits of UK households and non-bank companies, is a major component of the **liabilities side** of banks' balance sheets. The other liabilities denominated in sterling comprise sterling deposits from intermediate other financial corporations (IOFCs), non-residents and the public sector as well as non-deposit liabilities, such as long-term debt and equity.

The **asset side** of the UK banking sector balance sheet comprises lending to the non-bank private sector ($M4Lx^{ex}$) and, to a lesser extent, lending to IOFCs, non-residents and the public sector. Other sterling assets include banks' holdings of other financial assets (long-term debt and equity instruments).

The remainder of the banking sector balance sheet is denominated in foreign currency and may typically be less relevant for explaining movements in broad money. The gross foreign currency assets and liabilities of the banking sector are large, reflecting the international operations of the largest UK banks. It is their net position that is relevant in accounting for movements in broad money. And banks appear to keep their net currency exposures fairly stable over time.

Using this stylised balance sheet, changes in broad money can be mechanically accounted for by changes in the other components of the banking sector's balance sheet:[1]

$$\Delta\text{Broad money } (M4^{ex}) \equiv \Delta\text{Lending to non-bank private sector } (M4Lx^{ex}) + \Delta\text{Net sterling lending to IOFCs} + \Delta\text{Net sterling lending to non-residents} + \Delta\text{Net sterling lending to public sector} + \Delta\text{Net other sterling assets} + \Delta\text{Net foreign currency assets}$$

This framework can be used to decompose the flow into broad money over any given time period. It can therefore provide an insight into the factors affecting broad money supply since the onset of recession.

(1) Net changes are defined as changes in lending or other assets minus changes in deposits or other liabilities.

money growth. Broad money enters as a liability in the banking system's balance sheet. Using the identity that total assets must equal total liabilities, the counterparts framework decomposes movements in broad money in terms of changes in all the other assets and liabilities on banks' balance sheets. So, in an accounting sense, changes in broad money are equal to changes in lending and the other assets held by banks, net of any changes in their non-monetary liabilities, which include long-term debt and equity and any deposits outside the $M4^{ex}$ definition (such as those of overseas residents). The box above discusses the counterparts framework in more detail.

These counterpart movements will reflect, but not entirely reveal, the various transactions associated with QE. By considering each of the main counterparts in turn, it is possible to make inferences about how much of the observed changes in broad money over the QE1 and QE2 periods can be attributed to the direct impact of QE; the indirect effects of QE arising from portfolio rebalancing; and other (non QE–related) factors.

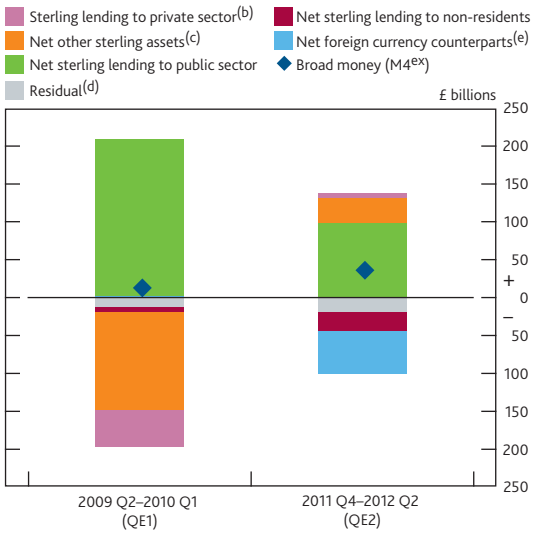
Chart 2 shows broad money growth during QE1 and QE2 and its balance sheet counterparts. As noted earlier, broad money growth was relatively weak in both periods. The major positive counterpart to broad money was net sterling lending to the public sector. This component largely represents purchases of government debt by the central bank and so reflects the positive impact of APF asset purchases on broad money in each period — that is, the direct effect of QE1 and QE2.

But there were also significant *drags* to broad money growth from other balance sheet counterparts during both QE1 and QE2. And these differed substantially between each episode. Below an assessment is made of the extent to which these counterpart movements are the indirect result of the portfolio rebalancing effects of QE — that is, the extent to which they are QE 'leakages'.

QE leakages during QE1

There were two main negative counterparts to broad money during QE1: first, a fall in 'net other sterling assets' of around £130 billion (orange segment in **Chart 2**), largely driven by a

Chart 2 Counterparts to changes in broad money[a]



Sources: Bank of England and Bank calculations.

(a) Net changes are defined as changes in lending or other assets minus changes in deposits or other liabilities.
(b) M4 lending excluding intermediate 'other financial corporations' and excluding the impact of securitisations and loan transfers.
(c) Net sterling lending to intermediate 'other financial corporations' plus sterling assets not elsewhere included, less equity capital, long-term debt securities and other sterling liabilities not elsewhere included.
(d) The sum of the balance sheet components does not add exactly to the total due to the method of seasonal adjustment used.
(e) Change in net foreign currency position of UK banks (including Bank of England) and building societies.

rise in non-deposit liabilities; second, a £50 billion fall in lending (pink segment in **Chart 2**), reflecting repayments of bank debt by the non-bank private sector. These drags on M4ex are likely to have been partly an indirect effect of QE itself. As discussed earlier, the fall in capital market yields induced by QE(1) is likely to have induced increased issuance of bank equity and long-term debt liabilities — which shows up as a fall in net other sterling assets — and a substitution by corporates away from bank loans and into capital market finance — reducing lending and broad money. The box on page 326 discusses some of the potential links between QE and bank lending in more detail.

Bridges and Thomas (2012) estimated that around £80 billion of the £180 billion drag from these counterparts was the indirect result of asset purchases. This figure was based on estimating the extent to which the balance sheet repair by banks and corporates would have been expected to occur regardless of QE, given the financial crisis and the experience in previous recessions. That implies a total increase in broad money of around £120 billion that is attributable to QE — that is, around 60% of the £200 billion of asset purchases carried out during this period.

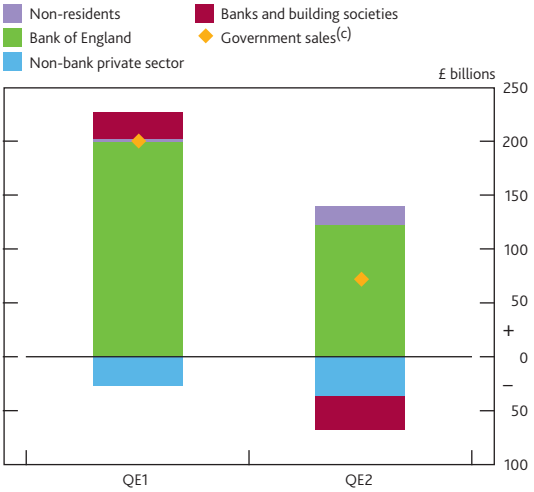
Although these leakages reduce the impact of QE on broad money, they may have some beneficial impact on the wider economy.(2) For example, bank debt and equity issuance may have been necessary during QE1 to strengthen the UK banking system, which in turn may have improved its lending capacity to the real economy in the longer term. And non-financial corporates may benefit if the interest burden on capital market debt is lower than for bank debt, which would improve their level of income gearing. But these benefits are difficult to quantify.

QE leakages during QE2

In contrast with QE1, bank issuance of long-term debt and equity instruments was minimal during QE2. And although there was some substitution by corporates from bank loans to capital markets, there was little overall repayment of bank debt by the non-bank private sector during QE2.

The main counterparts acting as a drag on broad money over the QE2 period are shown in the blue and red segments in **Chart 2**: net foreign currency counterparts and net sterling lending to non-residents. Also, banks sold around £30 billion of UK government debt (**Chart 3**), partly offsetting the monetary impact of the APF purchases. This explains why net sterling lending to the public sector (the green segment in **Chart 2**) increased by less than the amount of asset purchases during QE2. As with QE1, it is important to assess the extent to which these counterpart movements might be the indirect result of QE itself and to what extent they would have occurred anyway. The rest of this section discusses the main QE2 counterparts.

Chart 3 Changes in UK government debt holdings[a][b]



Sources: Bank of England, Debt Management Office and Bank calculations.

(a) Non seasonally adjusted.
(b) The QE1 period covers March 2009 to January 2010. The QE2 period covers October 2011 to April 2012.
(c) Net issuance of gilts and Treasury bills by the Debt Management Office minus net purchases by local government and public corporations.

Bank sales of government debt

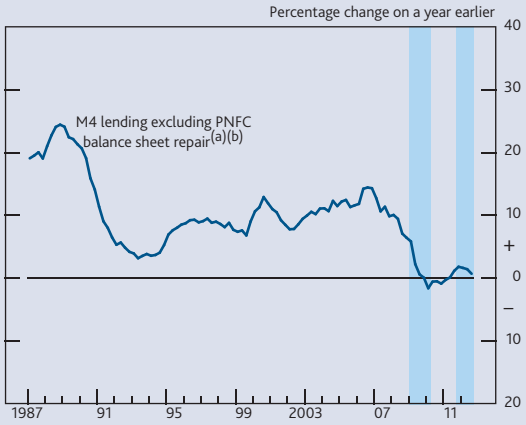
The low yields that occurred both in anticipation of, and throughout, the QE2 period may have induced banks to sell UK government debt. As discussed earlier, gilt sales by banks to non-banks correspond to a drawing down of non-bank

(1) See Joyce, Tong and Woods (2011) and Banerjee *et al* (2012) for evidence on the impact on financial yields.
(2) See Bridges, Rossiter and Thomas (2011) for more detail.

QE and lending to the real economy

QE boosts broad money without directly leading to, or requiring, a boost to bank lending. One criticism of QE has been that it has failed to encourage banks to lend in large quantities. And bank lending has been weak since 2008, including during the QE1 and QE2 periods (**Chart A**),[1] But increasing the provision of credit from the banking sector was not central to the policy as designed in the United Kingdom.[2] Instead, QE mainly works by going around the lending behaviour of the banking sector. It aims to increase private sector spending directly by raising asset prices and reducing the cost of borrowing from capital markets.

Chart A Bank lending and QE



Sources: Bank of England and Bank calculations. Periods of MPC asset purchases (QE) are shaded in blue.

(a) M4 lending 1963–98, M4 lending excluding intermediate 'other financial corporations' 1998–2012. Data are adjusted to exclude the impact of securitisations and loan transfers.
(b) The estimated effects of repayments of loans by corporates, which are attributed to QE (see **Table A** on page 329), have been removed.

Although QE does not need to boost bank lending directly, it may affect it indirectly through several channels.

As discussed earlier, QE may actually decrease the demand for bank lending slightly by decreasing firms' cost of borrowing from capital markets.[3] But this could be partly offset by other factors. For example, the cost of borrowing at fixed rates from banks may also fall slightly if falls in gilt yields caused by QE reduced the cost of banks' interest rate swap instruments and this was passed on to lending rates.[4] To the extent that this occurred, it may have increased applications for credit from households and firms.

Another way in which QE might indirectly boost bank lending is via its beneficial impact on employment and output. That would result in higher average incomes and higher company profits in future. In turn that may reduce the riskiness of making loans to the real economy and might encourage banks to lend more than otherwise.

QE could also indirectly boost the supply of bank lending for a given level of risk. This could occur if the overall increase in liquid assets in the banking system — resulting from the reserves created by QE — encouraged banks to lend. But it is not clear that an increase in reserves, on its own, would be enough to lead banks to lend more to the real economy. There are at least two reasons for this:

(i) First, it is a bank's stock of liquid assets relative to their liquidity needs, rather than the amount of liquid assets *per se,* that matters for lending. The reserves created by QE already have a liability against them — the bank deposits held by the non-bank private sector. If these were largely held by portfolio investors who might easily withdraw or transfer these deposits, then an individual bank may not feel that its overall liquidity position has improved sufficiently.

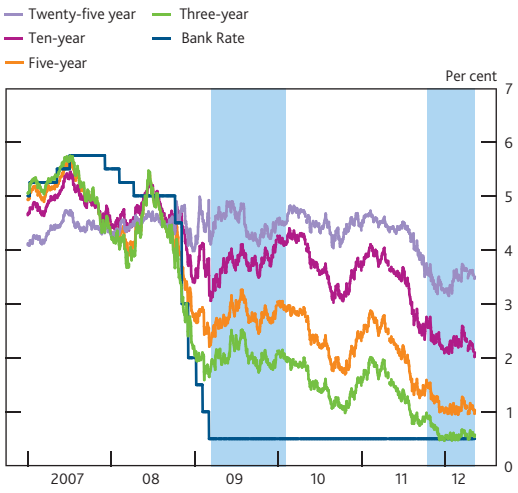
(ii) In order to increase the provision of bank lending, QE would need to directly incentivise the banking system to add not only more loans to its balance sheet, but also more liabilities. When banks lend, they automatically create additional liabilities. But for a bank to want to expand its lending it would also need to be content with the expected price of the additional liabilities. This could happen if portfolio rebalancing by the non-bank private sector reduced the costs of funding additional loans, through lowering the yields on bank debt and equity. But banks might face other constraints that may prevent them from increasing lending.

Overall, there are several ways in which QE may have indirectly affected bank lending. But it is not yet clear that these would have had large effects (and some could actually have decreased lending). This does not mean that QE is not working, as these channels were not expected to be key parts of its transmission mechanism.

(1) It is possible, however, that lending may have been even weaker in the absence of QE.
(2) This is in contrast to the Funding for Lending Scheme, which was designed to directly increase the supply of lending by banks. This Scheme is discussed in a separate article by Churm *et al* (2012) on pages 306–20 in this *Bulletin*.
(3) It is worth noting that while this would reduce lending and thus change the composition of firms' financing, total finance raised by companies, which includes issuance of debt and equity, would not necessarily be affected.
(4) See Button, Pezzini and Rossiter (2010) for more detail on the price charged by banks on new lending.

private sector deposits, hence a fall in broad money. Short-dated yields (less than three years) fell to levels close to, or even below, Bank Rate over this period (**Chart 4**). These yields were substantially lower than during QE1. That may have encouraged banks to sell some of the gilts they purchased prior to QE2 and would explain why similar sales of government debt by banks were not observed during QE1. It seems reasonable to assume that most of these sales were related to QE.

Chart 4 UK nominal spot gilt yields and Bank Rate[a]



Sources: Bloomberg and Bank calculations.

(a) Zero-coupon yield.

Non-residents' deposits

Investors who sold government debt to the APF may have used the proceeds to purchase sterling assets owned by overseas residents. These transactions lead to a fall in broad money as they reduce UK-residents' deposits (which are included in M4^{ex}) and increase non-residents' sterling deposits (which are excluded from M4^{ex}) by the same amount.

This leakage might explain some of the negative red segment (net sterling lending to non-residents) in **Chart 2**. In particular, during QE2, non-residents' sterling deposits started increasing, after falling for much of the period since the start of the financial crisis (**Chart 5**). If the periods before and after QE2 are taken as a guide to the underlying trend, it suggests that QE may have accounted for around £15 billion of the pickup in non-resident sterling deposits. The rest of this pickup could be explained by underlying factors, which may have included safe-haven inflows from non-residents.

Although purchases of assets by the UK non-bank private sector from non-residents represent a direct leakage from broad money, they do not necessarily imply a lower overall monetary impact from QE. For example, if overseas investors were to reinvest the proceeds of their asset sales into other sterling assets, that would still push up on sterling asset prices.

Chart 5 Cumulative flow of non-resident sterling deposits[a]

Sources: Bank of England and Bank calculations.

(a) Deposits with UK banks and building societies.

And those proceeds may ultimately find their way back into broad money if those subsequent asset purchases were made from UK residents.

Net sterling other assets and net foreign currency counterparts

The two significant remaining counterparts to broad money during QE2 are the positive net other sterling assets and negative foreign currency counterparts (orange and blue segments in **Chart 2**). These movements were not observed during QE1 and are difficult to attribute directly to any transactions arising from QE.

The negative foreign currency counterpart might suggest that investors have used the proceeds from asset sales to buy foreign currency assets. That would have led to a leakage from M4^{ex} into foreign currency deposits (held by either UK or overseas residents) which may have had implications for the exchange rate. But an analysis of the different subcomponents suggests both the foreign currency and net other sterling assets counterparts reflect large and offsetting movements associated with the revaluation of sterling and foreign currency derivative trades as well as other movements in banks' foreign currency capital. These movements are often quite volatile and typically reflect the hedging strategy and other trading activities of banks.[1] In the absence of strong evidence that such transactions are related to the portfolio rebalancing effects of QE, these counterparts are treated as part of the 'counterfactual' path for money, which is discussed later in the next section.

(1) Also, these often reflect specific intragroup transactions (with non-resident entities that are part of the same company) with no wider macroeconomic significance.

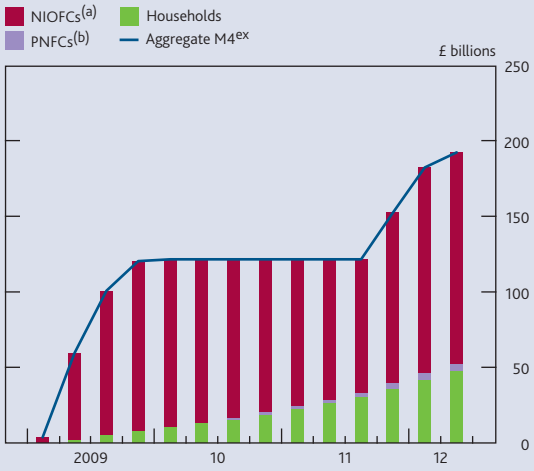
The QE impact and the counterfactual path for broad money in context

This box assesses the estimates of the quantitative impact of QE discussed in the main text of the article and the implied 'counterfactual path' for broad money by analysing the behaviour of disaggregated money holdings. First, the counterfactual behaviour of sectoral money balances is investigated to see if it is consistent with the lags with which QE affects the economy. And, second, the data on different types of money holdings are analysed, as the transmission mechanism of QE also implies a lagged impact on different measures of money. This collective evidence supports the conclusion in the main text that our estimates for the impact of QE and the implied counterfactual path for broad money do not look unreasonable.

Does the counterfactual behaviour of sectoral money holdings look plausible?

The behaviour of sectoral money holdings might provide a plausibility check on the impact of QE. As non-bank financial companies sell gilts to the Bank of England, the share of their holdings of broad money should rise. This share should decline over time as companies and households respond to higher asset prices by increasing their spending. **Chart A** shows what the aggregate net impact of QE1 and QE2 on broad money (estimated in **Table A** on page 329) would imply for the distribution of money holdings by sector, using the models discussed in Bridges and Thomas (2012).

Chart A Estimated cumulative impact of QE on sectoral money holdings since 2009 Q1

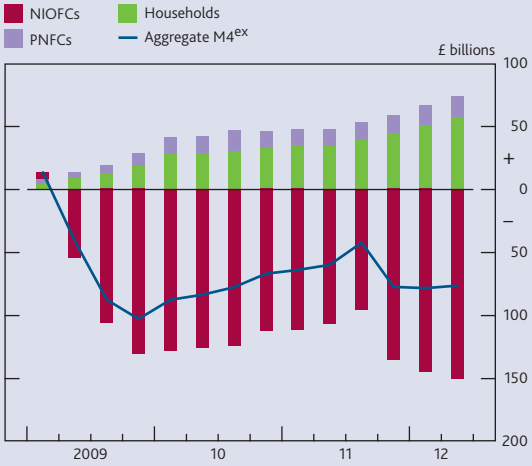


Sources: Bank of England, Bridges and Thomas (2012) and Bank calculations. The aggregate impact reflects the combined estimates of the impact of QE1 and QE2 net of the indirect leakages shown in **Table A** on page 329.

(a) Non-intermediate other financial corporations.
(b) Private non-financial corporations.

The plausibility of the counterfactual path for sectoral money holdings can be assessed by subtracting these implied sectoral QE effects from the data. This is shown in **Chart B**. It suggests that, in the absence of QE, money holdings by financial corporations (specifically, non-intermediate other financial corporations (NIOFCs)) would have fallen since 2009, partly offset by an increase in households' and private non-financial corporations' (PNFCs') holdings.

Chart B Counterfactual cumulative increase in sectoral money holdings since 2009 Q1



Sources: Bank of England, Bridges and Thomas (2012) and Bank calculations.

Much of the weakness in the *underlying* path for NIOFCs' money in 2009 and 2010 (shown in **Chart B**) is likely to reflect the absorption of long-term debt and equity issuance of the banking sector that is not attributed to QE. The rest may reflect some sectoral shift in money holdings as observed in previous recessions. For example, the government usually runs a cyclical deficit in recessions, as benefit payments to households and PNFCs increase and the average tax rates they pay tend to decrease ('automatic stabilisers'). The government partly finances this deficit by issuing bonds to the NIOFC sector which, in part, will be financed by running down their money holdings. So the existence of a large public sector deficit may explain some of this shift in deposits from NIOFCs to the other sectors. Also, increased uncertainty in a recession may make households less willing to hold risky investments. So they may invest less than usual in risky assets and keep more in the form of bank deposits. That, too, could explain some of the shift between NIOFCs' and households' money in the counterfactual.

Does the breakdown of money holdings by instrument support the analysis?

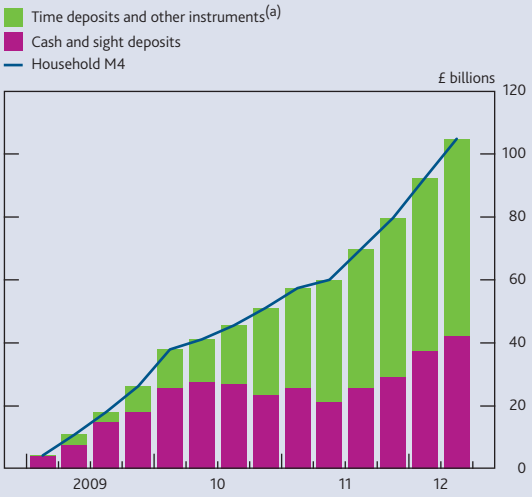
An instrument breakdown of broad money may also help validate whether the impact of QE and the implied counterfactual look plausible. The transmission mechanism of QE should also imply that different components of money should be affected at different times. If the past effects of QE1 are still affecting nominal spending, some increase in money

used for transactions such as notes, coins and sight deposits should be evident in the data. Indeed, **Chart C** shows that just under half of the increase in household deposits between 2009 Q1 and 2012 Q2 was accounted for by cash and sight deposits. A risk to this conclusion is that the pickup in cash and sight deposits may also be related to the current environment of low deposit rates and increased uncertainty, where the gain in liquidity from holding cash and sight deposits exceeds the extra interest offered by saving instruments such as time deposits and cash ISAs.

Conclusion

The behaviour of sectoral money in the absence of QE — namely the shift of deposits from financial corporations to other sectors — seems plausible given a number of features which could be associated with the recent recession, such as the government's cyclical deficit and increased uncertainty. And the breakdown of household money holdings by instrument shows an increase in money used for transactions over recent years, which is consistent with the lags implied by the transmission mechanism of QE. Taken together, both pieces of evidence suggest that our estimates for the impact of QE and the implied counterfactual path for broad money do not look implausible.

Chart C Cumulative increase in household M4 by instrument since 2009 Q1



Sources: Bank of England and Bank calculations.

(a) Includes a small seasonal adjustment residual.

A summary of the quantitative effects

Table A summarises the impact of QE1 and QE2 on broad money. The estimated increase in broad money, net of leakages, resulting from QE2 (£70 billion) represents just under 60% of the amount of assets purchased in QE2 (£125 billion). **So, when the indirect effects of QE are taken into account, the monetary impact of QE2 appears similar to that of QE1 when scaled by the volume of asset purchases in the two episodes.** But there are risks around this conclusion.

First, on the upside, non-resident sterling deposits may be equally important as UK-residents' holdings in the transmission mechanism of QE, even if they are not included in the headline measure of broad money. Including these deposits in the QE2 accounting would imply a slightly larger monetary impact than QE1, of around 70% of total QE2 asset purchases.

Second, on the downside, the monetary leakages during QE2 were different to QE1. In particular, the main QE2 leakage came from sales of government debt by banks, as opposed to through bank balance sheet repair, which was the case during QE1. Bank balance sheet repair may have a beneficial side effect on the economy — given it should increase the long-term capacity of banks to lend — whereas this is less clear for banks' sales of gilts.

Table A Estimated impact of QE1 and QE2 on broad money(a)

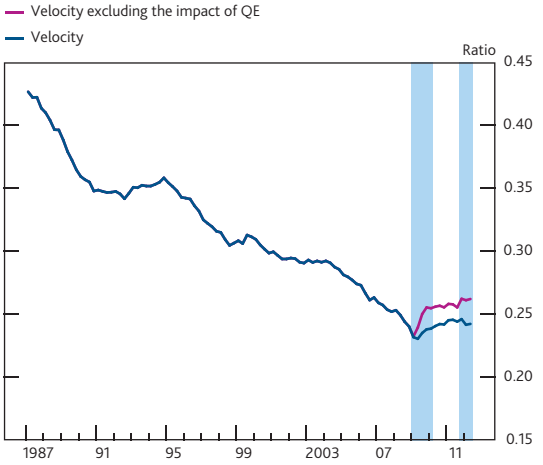
Factor	QE1(b) (£ billions)	QE2(c) (£ billions)
Direct effect of asset purchases	200	125
minus corporate substitution from bank loans to capital markets attributable to QE	*16*	*8*
minus purchases of debt and equity issued by banks attributable to QE	*62*	*0*
minus purchases of non-resident assets attributable to QE	*0*	*16*
minus bank sales of government debt attributable to QE	*0*	*31*
Estimated impact of QE net of indirect leakages	122	70
Impact of QE on broad money as a percentage of asset purchases	**61%**	**56%**
Actual broad money flow	13	31
Implied counterfactual flow	-109	-38

Sources: Bank of England, Bridges and Thomas (2012) and Bank calculations.

(a) $M4^{ex}$ — that is M4 excluding intermediate 'other financial corporations'.
(b) The period covers 2009 Q2 to 2010 Q1 as monthly data were not available.
(c) The period covers October 2011 to April 2012.

Finally, it is important to assess whether the implied underlying growth rate of money looks sensible. One way of assessing its plausibility is by comparing the behaviour of velocity — the ratio of nominal spending to broad money — in the absence of asset purchases to what would have been expected during a recession. Based on the analysis of this article, broad money flows would have been negative

Chart 6 Velocity of broad money[a][b]



Sources: Bank of England, Bridges and Thomas (2012), ONS and Bank calculations.

(a) Nominal GDP is measured at market prices.
(b) Defined as quarterly nominal GDP divided by the outstanding stock of broad money.

(-£109 billion in QE1 and -£38 billion in QE2) in the absence of asset purchases. And, based on the estimates of Bridges and Thomas (2012), nominal spending would have been around 5% lower than otherwise by mid-2012.[1] This suggests that 'underlying' velocity (excluding QE) would have been increasing slightly in 2011 and 2012 (the magenta line in **Chart 6**).[2] A flat to gently rising profile for velocity has indeed been a feature of previous UK recessions, such as in the early 1990s.[3] So the implied 'underlying' path for velocity provides some support to the estimates of the QE effect and the broad money counterfactual. The box on pages 328–29 discusses the plausibility of the counterfactual further by exploring the behaviour of money holdings at a more disaggregated level. It also concludes that our estimates for the impact of QE and the implied counterfactual path for broad money do not look implausible.

Conclusion

The monetary impact of QE2 looks very similar to that of QE1. Our estimates suggest that just under 60% of asset purchases have fed through into the headline measure of broad money. And, although not covered in this article, the pickup in broad money growth during the latest round of asset purchases ('QE3') would also appear to indicate a positive effect of asset purchases. But the monetary leakages during QE2 were very different to QE1. In particular, during QE2 banks sold government debt and carried out little balance sheet repair compared to QE1. To the extent these leakages had different effects, this suggests that the transmission mechanism of QE may have varied over time.

(1) These are comparable to the range of estimates of QE's impact on the economy discussed in Joyce, Tong and Woods (2011).
(2) As discussed in Bridges and Thomas (2012), QE would be expected to lower velocity temporarily in the near term given that the increase in broad money will take time to affect nominal spending. That implies each round of asset purchases will introduce a 'V'-shape into the path of velocity. That can be seen in **Chart 6** where QE1 and QE2 both initially push down on velocity relative to its underlying path. Bridges, Rossiter and Thomas (2011) also discuss the short-lived 'V'-shaped profile of underlying velocity in 2009.
(3) This is in contrast to the downward trend observed in velocity since the 1980s, which largely reflected an increase in financial liberalisation and competitiveness within the banking sector. This is discussed further in Bridges, Rossiter and Thomas (2011).

References

Banerjee, R, Latto, D, McLaren, N and Daros, S (2012), 'Using changes in auction maturity sectors to help identify the impact of QE on gilt yields', *Bank of England Quarterly Bulletin*, Vol. 52, No. 2, pages 129–37.

Bell, V and Young, G (2010), 'Understanding the weakness of bank lending', *Bank of England Quarterly Bulletin*, Vol. 50, No. 4, pages 311–20.

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.

Bridges, J, Rossiter, N and Thomas, R (2011), 'Understanding the recent weakness in broad money growth', *Bank of England Quarterly Bulletin*, Vol. 51, No. 1, pages 22–35.

Bridges, J and Thomas, R (2012), 'The impact of QE on the UK economy — some supportive monetarist arithmetic', *Bank of England Working Paper No. 442*.

Burgess, S and Janssen, N (2007), 'Proposals to modify the measurement of broad money in the United Kingdom: a user consultation', *Bank of England Quarterly Bulletin*, Vol. 47, No. 3, pages 402–14.

Button, R, Pezzini, S and Rossiter, N (2010), 'Understanding the price of new lending to households', *Bank of England Quarterly Bulletin*, Vol. 50, No. 3, pages 172–82.

Capie, F and Webber, A (1985), *A monetary history of the United Kingdom, 1870–1982*, Vol. 1, Routledge.

Churm, R, Leake, J, Radia, A, Srinivasan, S and Whisker, R (2012), 'The Funding for Lending Scheme', *Bank of England Quarterly Bulletin*, Vol. 52, No. 4, pages 306–20.

Hills, S, Thomas, R and Dimsdale, N (2010), 'The UK recession in context — what do three centuries of data tell us?', *Bank of England Quarterly Bulletin*, Vol. 50, No. 4, pages 277–91.

Joyce, M, Tong, M and Woods, R (2011), 'The United Kingdom's quantitative easing policy: design, operation and impact', *Bank of England Quarterly Bulletin*, Vol. 51, No. 3, pages 200–12.

Influences on household spending: evidence from the 2012 NMG Consulting survey

By Philip Bunn and Jeanne Le Roux of the Bank's Structural Economic Analysis Division, Robert Johnson of the Bank's Risk Assessment Division and Michael McLeay of the Bank's Monetary Assessment and Strategy Division.

A number of factors are likely to have restrained household spending growth over the recent past, including weak income growth, tight credit conditions, concerns about debt levels, the fiscal consolidation and uncertainty about future incomes. This article examines the factors affecting spending and saving decisions using the latest survey of households carried out for the Bank of England by NMG Consulting. Real incomes have been squeezed. Concerns about debt levels and tight credit conditions appear to be important factors supporting saving. But many households are also uncertain about their future incomes and have been affected by the fiscal consolidation. Over the next year, households do not expect to change the amount they save significantly, with the same factors that have supported saving recently continuing to be important.

Introduction

Spending by households accounts for around two thirds of all expenditure in the UK economy, so movements in consumption have an important impact on GDP. This article examines the factors affecting individual households' spending and saving decisions using the latest survey carried out for the Bank by NMG Consulting.(1)

The macroeconomic context

Real consumer spending fell by around 6% during the 2008/09 recession and it has been broadly flat since the end of 2009.(2)

Subdued household spending partly reflects weakness in real incomes. Real post-tax income in 2012 Q2 was only just above its level at the end of 2007 as modest growth in nominal incomes has been eroded by increases in VAT, energy prices and import prices.

Households have chosen to save more since the crisis, and that has also weighed on spending. The saving ratio increased sharply during 2008 and 2009 and remains well above its level before the 2008/09 recession (**Chart 1**). That increase is likely to reflect a number of factors:

- Tighter credit conditions may have raised saving by forcing first-time home buyers to save more to purchase a property and, more generally, by restricting borrowing to fund spending.

Chart 1 Household saving ratio(a)

(a) Percentage of household post-tax income.
(b) Recessions are defined as at least two consecutive quarters of falling output (at constant market prices) estimated using the latest data. The recessions are assumed to end once output began to rise.

- Households may have increased saving to help reduce their debt levels if they felt more vulnerable to possible adverse events than in the past.

(1) The NMG Consulting survey is carefully designed and weighted to be representative of British households in terms of the following characteristics: age, social grade, region, working status and housing tenure. But, as in any small sample of a population, care must be taken in interpreting small changes in results from year to year because they may not be a reliable guide to changes in the population.
(2) Section 2 of the November 2012 *Inflation Report* contains a more detailed discussion of recent developments in household spending. Preliminary results from the NMG Consulting survey are discussed in the box on pages 22–23 of that *Report*.

- The fiscal consolidation may have encouraged some households to save more, for example, because they anticipate tax increases in the future.

- Heightened uncertainty about future income may also have led households to save more as a precaution against unexpected falls in income.

The 2012 household survey

The factors affecting consumption *in aggregate* are likely to have had different effects across different households. For example, tighter credit conditions will primarily have affected those who wanted to borrow money. Moreover, households facing similar circumstances may choose to respond in different ways. To be able to understand movements in aggregate data, it is helpful to examine disaggregated data to assess the differences across households.

The survey is the tenth that the Bank has commissioned NMG Consulting to conduct on household finances.(1) Households were asked a range of questions about their finances that can help to shed light on the reasons for their spending and saving decisions. These included questions about current income, credit conditions, debt, the impact of the fiscal consolidation and uncertainty about future income.

The main 2012 survey was undertaken online between 12 September and 3 October and covered around 4,000 households.(2) A smaller, face-to-face survey of around 2,000 households was also conducted between 21 September and 8 October, but this included only a subset of questions on income and debt. This is the first year that the main survey has been carried out online. In previous years the full survey has been carried out face-to-face with online pilots in 2010 and 2011. Differences between the online and face-to-face surveys and other aspects of the survey methodology are discussed in the box on page 334. Unless otherwise stated, this article reports results from the online surveys in 2011 and 2012.

Online surveys have a number of benefits. First, they may encourage households to be more open about sensitive topics such as the state of their finances. Second, it is easier to build a longitudinal element to the survey whereby some of the same households are questioned from one year to the next. Further details on the longitudinal aspect of the survey and some additional insights it can offer are discussed in the box on page 335.

The structure of this article is as follows. The first section summarises what survey respondents report has happened to their income and saving over the recent past. The factors affecting spending and saving decisions are then discussed in more detail in the next section. Finally, the article considers the prospects for spending and saving over the next year.

Recent developments in income and saving

According to aggregate data, real incomes have been eroded over recent years following subdued growth in nominal incomes and increases in VAT, energy and import prices. The share of income saved has also risen since 2008. Those factors can explain why aggregate consumption has been weak.

Results from the NMG survey corroborate the view that real incomes have been squeezed over the past year. Average nominal incomes were little changed from the 2011 survey (**Table A**).(3) Twelve-month aggregate CPI inflation was 2.2% in September 2012 and, when combined with flat nominal incomes, that implies that average real incomes had fallen slightly, although the impact of different price increases on spending power may have varied across households.

Table A Monthly income[a][b]

	Face-to-face			Online	
	2008	2009	2010	2011	2012
Mean pre-tax income (£)	2,609	2,706	2,659	2,670	2,627
Mean available income (£)	630	637	634	699	692

Sources: NMG Consulting survey and Bank calculations.

(a) Questions: 'What is the total annual income of the whole of your household, before anything is deducted for tax, national insurance, pension schemes etc?'. 'How much of your monthly income would you say your household has left after paying tax, national insurance, housing costs (eg rent, mortgage repayments, council tax), loan repayments (eg personal loans, credit cards) and bills (eg electricity)?'.
(b) Calculations exclude households who report available income greater than pre-tax income.

Low-income households, in particular, reported a squeeze in incomes. Sixty-two per cent of households in the lowest quartile of the income distribution said that their available income — income after tax, national insurance, housing costs, loan repayments and bills — had fallen over the past year, compared to 48% for the top quartile. For a given change in aggregate income, the overall effect on spending may be larger if it disproportionately affects low-income households because those households report that they are more likely to adjust their spending in response to falls in income. The box on pages 338–39 describes more evidence on how spending reacts to changes in income.

The amount that households reported that they had saved in the 2012 survey is similar to 2011. In both years, households reported that they put an average of around £185 per month aside in savings accounts or other assets. That represented around 7% of their total pre-tax income, or a quarter of households' available income. The aggregate saving ratio recorded in the National Accounts was also relatively flat over

(1) The results of each year's survey have been reported in the *Quarterly Bulletin*. See Kamath *et al* (2011) for details of the 2011 survey.
(2) The raw survey data are available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/nmgsurvey2012.xls.
(3) There are some systematic differences between incomes reported in the online and face-to-face surveys, as discussed in the box on page 334.

Survey method

Introduction and methodology

This year, the main survey of around 4,000 households was carried out online, alongside a smaller, face-to-face survey of 2,000 households that covered only a subset of questions. The move to using an online survey follows successful pilots in 2010 and 2011 (covering around 500 and 1,000 respondents respectively).

The 2012 online survey was carried out between 12 September and 3 October. The face-to-face survey was conducted between 21 September and 8 October by adding questions to a regular weekly survey, Capibus, run by Ipsos MORI. Aspects of both surveys were designed to encourage disclosure, including respondents being told that the survey was being carried out on behalf of the Bank of England and that their replies would be treated in the strictest confidence. Responses to both surveys were weighted using the same variables — age, social grade, region, working status and housing tenure — to be representative of Great Britain.

Financial values are reported in ranges in the survey. As in previous years, ratios calculated in this article assume that each respondent's weight is uniformly distributed between the minimum and maximum value of the ratio consistent with the ranges selected, except when computing saving as a proportion of incomes.(1)

Comparison of online and face-to-face surveys

By comparison with traditional face-to-face methods, self-administered online surveys have a number of potential advantages. Most importantly, asking households questions in a less time-pressured situation without the presence of an interviewer might increase disclosure about sensitive issues, such as those related to household finances.(2) For example, in the face-to-face survey, 13% of households refused to disclose their secured debts and 16% said that they did not know the value of their secured debts, compared to 3% and 2%, respectively, in the online survey. Online surveys also make it easier and cheaper to cover a larger sample, which should improve the reliability of the results, particularly when looking at subsets of the sample. And online surveys make it easier to survey the same households from one year to the next (see the box on page 335).

Online surveys also have some potential drawbacks. First, there may be self-selection into online surveys, which could mean that the panel is not representative. Second, online samples may be biased because not all households have internet access, particularly the elderly and those on low incomes. Average income in the online sample was, however, lower than in the face-to-face survey (**Table 1**). That could reflect households overstating their income in the face-to-face survey. Relative to ONS data from the Living Costs and Food Survey, the online sample contains more middle-income households and fewer on high incomes, but it represents the lower part of the income distribution well (**Chart A**).

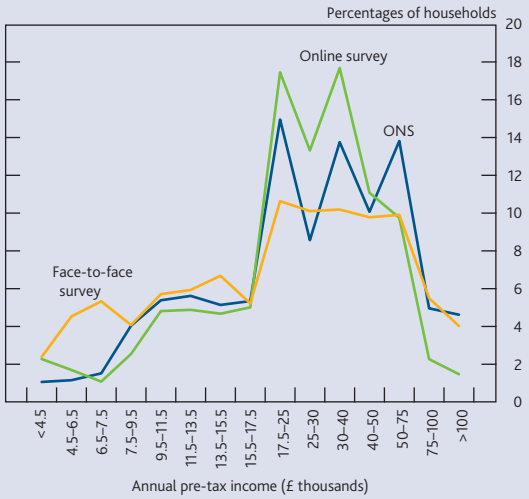
Table 1 Comparison of online and face-to-face surveys

	2011		2012	
	Online	Face-to-face	Online	Face-to-face
Mean monthly pre-tax income (£)[a]	2,670	2,905	2,627	2,769
Percentage of households with unsecured debt	65	54	63	51
Mean unsecured debt (£, unsecured debtors only)	6,485	5,946	5,928	n.a.
Percentage of unsecured debtors reporting unsecured debt repayments to be a burden	60	45	61	40
Mean secured debt (£, secured debtors only)	78,899	99,625	85,189	84,008
Percentage of mortgagors having problems paying for housing	20	10	19	12

Sources: NMG Consulting survey and Bank calculations.

(a) Excludes households who report available income greater than their pre-tax income, except for the 2012 face-to-face results where this was not possible.

Chart A Distribution of household income[a][b]



Sources: NMG Consulting survey, ONS and Bank calculations.

(a) ONS data are from the Living Costs and Food Survey and are for the year 2010/11 (the latest available data); NMG Consulting data are for 2012.
(b) NMG Consulting data exclude households who report available income greater than pre-tax income.

Households were more likely to report that they have unsecured debt in the online survey than in the face-to-face survey (**Table 1**). The average size of those debts was also higher in the online survey, as was the proportion of respondents that reported that their unsecured debts were a burden. Similarly, a higher proportion of mortgagors reported difficulties paying for their housing in the online survey. These responses are likely to reflect respondents feeling more comfortable answering the questions in an online environment and therefore the responses are more likely to be a true reflection of households' finances.

(1) For further details see Nielsen *et al* (2010).
(2) Dayan, Paine Schofield and Johnson (2007) found that disclosure levels to sensitive questions were higher in online surveys.

The longitudinal aspect of the NMG survey

Conducting the survey online has facilitated the introduction of a longitudinal element to the survey: that is, some of the same households can now easily be sampled from one year to the next. Three hundred and fifty one of the respondents to the latest survey had also completed the survey in 2011 (around one third of the 2011 online survey) and the remainder were new respondents. Although the 2012 longitudinal data set is only small, the 2012 online survey sample size is four times larger than in 2011 and a continuation of this trend in response rates in 2013 would create a larger longitudinal element to the survey.

Advantages of longitudinal data

There are a number of advantages of longitudinal data over cross-sectional data:

- By observing the same individuals over time, it is easier to distinguish between **competing hypotheses**, for example whether observed changes in the data reflect genuine changes in the state of households' finances or simply differences in the households sampled.
- Panel data can also be used to examine **distributional changes**, for example whether the same households tend to find their debt a burden each year or whether it tends to be different households at different points in time.

The main drawback of longitudinal data revolves around the difficulty of ensuring that the sample is representative, particularly if individuals with certain characteristics are more likely to remain in the sample.

Examples of longitudinal data analysis

The longitudinal observations for 2011 and 2012 give insights into households' financial positions that cannot be obtained from the repeated cross-sectional data. For example, the longitudinal data show that households that reported that they were concerned about their levels of debt in the 2012 survey had been actively paying down their debts over the past year. Households that were concerned about their debt levels, on average, reduced their debt by more than households that were not concerned (£6,883 compared to £676). And households that reported that they had cut back spending because of concerns about debt reduced their debts, on average, by even more (£7,374).

The longitudinal data also show that financial difficulties appear to be persistent over time. Of the households that considered their unsecured debt repayments to be either somewhat of a burden or a heavy burden in 2011, 71% reported that they were still a burden in 2012.

the same period (**Chart 1**).(1) The NMG survey shows that there are differences in the distribution of saving ratios, with those households that have high incomes saving a larger share of their income (**Chart 2**). Saving ratios were also higher for households with higher incomes in 2011.

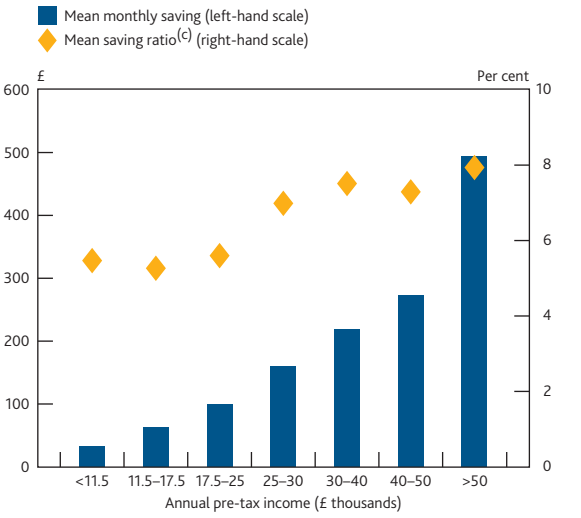
Factors affecting recent spending and saving decisions

Credit conditions

Household credit conditions have tightened significantly since the start of the financial crisis. Respondents to the NMG survey reported that credit conditions remained tight in 2012. The tightening in credit conditions partly reflects a reduction in credit supply by banks, caused by strains in bank funding markets.(2) To help alleviate this problem, the Bank of England and HM Treasury launched the Funding for Lending Scheme (FLS), which started in August 2012 (see Churm *et al* (2012) on pages 306–20 in this *Bulletin* for more details). As the NMG survey was carried out in late September and early October, it was likely to have been too early for the FLS to have had an impact on the results.

Tight credit conditions have discouraged some households from spending. Twenty-six per cent of households reported

Chart 2 Monthly saving(a)(b)



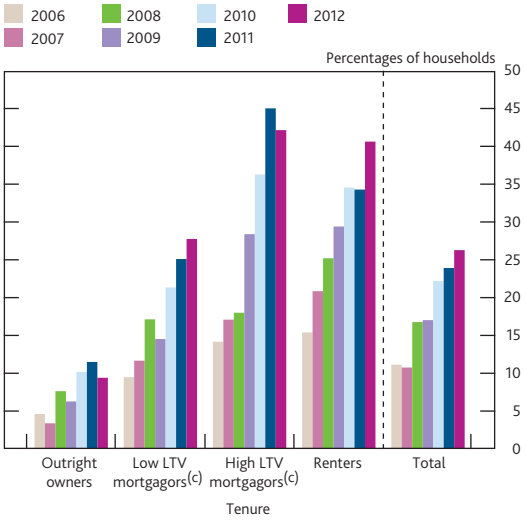
Sources: NMG Consulting survey and Bank calculations.

(a) Question: 'In general over the past year, how much of your household income would you say that you put aside as savings each month (eg put into savings accounts or other assets, but excluding money paid into pensions)?'.
(b) Excludes households whose minimum possible saving exceeds their maximum possible pre-tax income.
(c) The saving ratio is defined as monthly saving divided by monthly pre-tax income.

(1) The National Accounts definition of the saving ratio differs from that in the NMG survey. The numerator in the National Accounts saving ratio refers to the amount of income that is not consumed, but the NMG survey asks about how much is put aside as savings each month. The denominator in the National Accounts measure is post-tax income, while the NMG saving ratio uses pre-tax income.
(2) See Bell and Young (2010) for more details.

that they were put off spending by concerns over the availability of credit in the 2012 survey, similar to the 24% who were put off in 2011 (**Chart 3**).

Chart 3 Proportion of households put off spending by credit availability concerns[a][b]



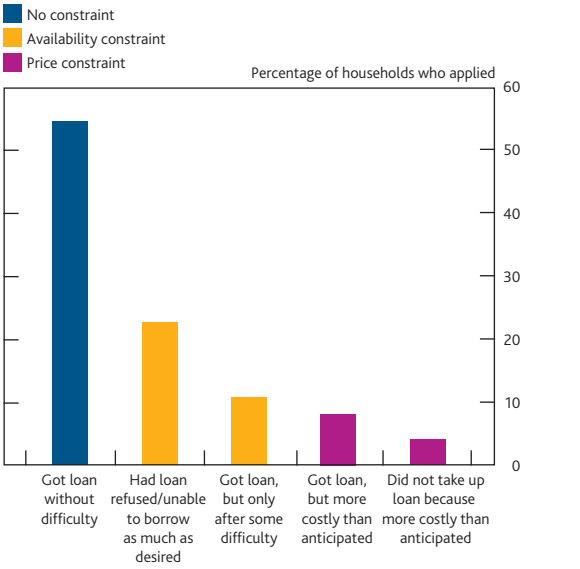
Sources: NMG Consulting survey and Bank calculations.

(a) Question: 'Have you been put off spending because you are concerned that you will not be able to get further credit when you need it, say because you are close to your credit limit or you think your loan application will be turned down?'.
(b) Results reported for 2006 to 2010 are from the face-to-face survey and results for 2011 and 2012 are from the online survey.
(c) High loan to value (LTV) mortgagors are those households with an LTV ratio above 75%; low LTV mortgagors are those with an LTV ratio of 75% or below.

Tight credit conditions for borrowers are likely to reflect both restrictions on the amount of credit available from banks and the cost of borrowing being too high for them. A new question in the 2012 survey can be used to help assess the relative importance of each factor. Twelve per cent of households in the survey had applied for a loan over the past year. Of these, just over half were granted loans without difficulty, 23% of applicants did not end up getting the credit that they had hoped for, and 11% eventually got the loan after difficulty, indicative of constraints on the amount of credit available (**Chart 4**). Eight per cent got the loan but reported that it was more costly than anticipated and 4% did not take up the loan because it was too expensive — constraints related to the pricing of the loan. Of course, it is impossible to know how these results compare to the period before the crisis. The survey question only addresses households that applied for a loan, and it may understate the role of prices, since some prospective borrowers may have been put off by high loan rates — which tend to be more visible than credit availability — before applying. The average income of those who succeeded in their applications was around £10,000 a year higher than those who faced constraints. That may suggest that some prospective borrowers faced these constraints because they posed higher risks.

One group that have been disproportionately affected by tight credit conditions are the young. Younger households living in rental accommodation were more likely than older renting

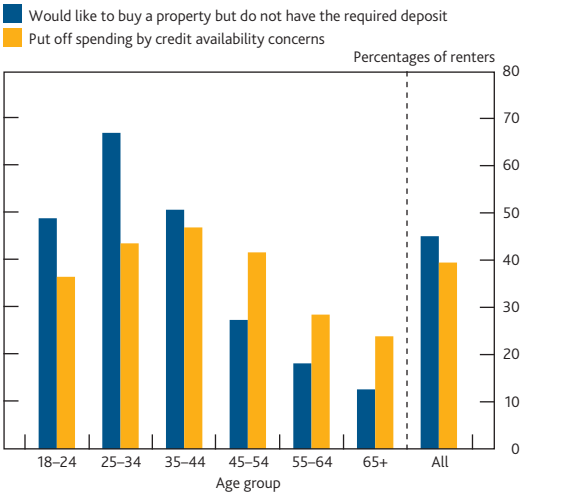
Chart 4 Outcome of loan applications[a][b]



Sources: NMG Consulting survey and Bank calculations.

(a) Questions: 'Have you applied for one or more new loans (including mortgage applications) over the past year?'. 'What was the final outcome of your loan application(s)?'.
(b) Calculations exclude households whose applications were still ongoing.

Chart 5 Households in rental accommodation affected by credit constraints, by age[a]



Sources: NMG Consulting survey and Bank calculations.

(a) Questions: 'Would you like to buy a property but are unable to obtain a mortgage because of the deposit requirement?'. 'Have you been put off spending because you are concerned that you will not be able to get further credit when you need it, say because you are close to your credit limit or you think your loan application will be turned down?'.

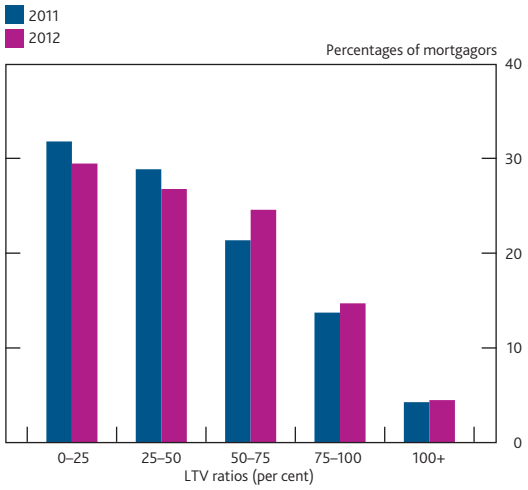
households to report that they had been put off spending by tight credit conditions and that they had been unable to buy a house because they could not afford the deposit required to obtain a mortgage (**Chart 5**). Both factors are likely to have boosted saving and reduced spending in those households.

Households that could not afford the deposit needed for a house purchase said that they were likely to save for an extended period to build up a sufficient deposit. On average, households wishing to buy a property reported that they expected to continue saving for around a further six years. Given their planned levels of saving, this implies that they expected to need deposits of around £16,000.

Balance sheets

Household debt levels appear to have increased slightly over the past year. Relative to the 2011 online survey, the average level of secured debt has risen a little, although that increase was partially offset by a fall in unsecured debt holdings. Within that increase in the average outstanding mortgage balance, there were fewer households with loan to value (LTV) ratios below 50% and more with LTV ratios between 50% and 75% (**Chart 6**). The proportion with high LTV ratios was broadly unchanged in the 2012 survey.

Chart 6 Distribution of loan to value ratios on mortgagors' outstanding secured debt[a]



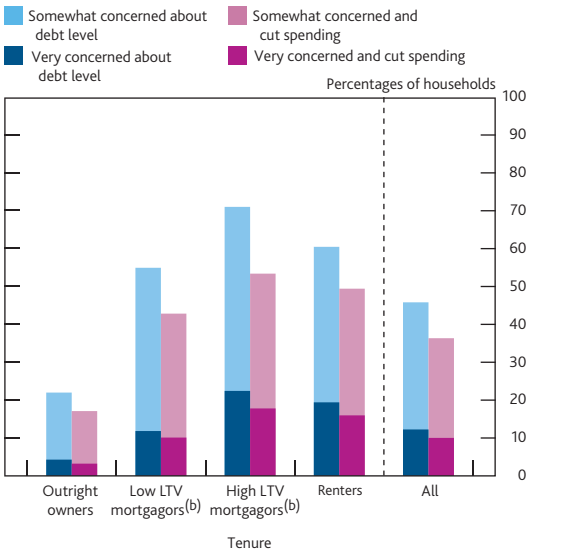
Sources: NMG Consulting survey and Bank calculations.

(a) Mortgage debt from NMG survey captures only mortgage debt owed on households' primary residences.

A large proportion of households reported that they were concerned about their debt levels. Twelve per cent of respondents said that they were 'very concerned', while a further third were 'somewhat concerned' (**Chart 7**). Concerns about debt levels were greatest among households with high LTV mortgages. But a significant proportion of those with smaller mortgages and renters were also concerned. Among renters who have unsecured debts, concerns were greatest among low-income households. Those concerns do not necessarily mean that households are currently having difficulties making repayments, although 5% of all households said that they had fallen behind with at least some bills and credit commitments and it was a constant struggle to keep up for a further 17%.

The most common response among households that were concerned about their debts has been to cut spending. Among those who expressed some concern, 78% had cut back spending, which is 35% of all households (**Chart 7**). Other responses to concerns about debt levels included working longer hours and/or getting a second/better-paid job (22% of concerned households), making overpayments (21%) and getting financial help from family or relatives (10%).

Chart 7 Concerns about debt and response to those concerns[a]



Sources: NMG Consulting survey and Bank calculations.

(a) Questions: 'Whether or not you are having difficulties making repayments, how concerned are you about your current level of debt?'. 'What actions, if any, are you taking to deal with your concerns about your current level of debt?'.
(b) High LTV mortgagors are those households with an LTV ratio of above 75%; low LTV mortgagors are those with a ratio of 75% or below.

When asked whether concerns about debt have increased over the past two years, a net balance of 12% of households reported that their concerns had risen. The largest increases were among high LTV mortgagors and then renters. The results imply that deleveraging could have had a larger impact on spending in 2012 than it did in 2010, although increased concerns about debt could also reflect other factors such as greater uncertainty about future income rather than simply a reappraisal of debt levels.

Fiscal consolidation

A substantial fiscal consolidation has been taking place since 2010. To date, that has primarily been achieved through a combination of lower public spending, a reduction in public investment and higher VAT. Further planned consolidation is likely to largely take the form of reduced public expenditure (which includes spending on goods and services, benefit payments and public sector wages) as a share of GDP. The survey included questions that asked households how they had been affected by the measures implemented and how they had responded to those measures.

Around half of all households reported that they had been affected over the past year by measures to reduce the fiscal deficit, broadly in line with the 2011 survey (**Table B**). Higher taxes, lower spending on services and lower benefits were the most often cited ways in which households had been affected by the fiscal consolidation over the past twelve months. A striking difference between the 2011 and 2012 responses is the decline, from 21% to 6%, in the proportion of households reporting to have been affected via lower income. But that could reflect a change in the wording of the question rather

Estimates of marginal propensities to consume

The way in which households adjust their spending in response to unexpected changes in income has important implications for the transmission of changes in monetary policy through to output and inflation. Responses may vary across households and according to the type of income shock.

The marginal propensity to consume (MPC) discussed here measures the share of an unexpected rise in income that is spent (or the proportion by which spending is cut when income falls). The 2011 NMG survey, for the first time, included questions that facilitated the calculation of MPCs. Asked again in 2012,(1) responses to these questions allow for a robustness check of the 2011 results. Additionally, a new question in the 2012 survey makes it possible to distinguish between the response of households to ***temporary*** versus ***permanent*** income shocks.

Households were asked whether their annual household income was higher, lower or the same as expected a year ago. Nearly 40% of households reported that they had experienced an income shock. Of those, 31% experienced positive income shocks and 69% negative income shocks. Positive income shocks were, on average, equal to 18% of annual pre-tax household income, while negative shocks were larger, at 37%. Comparing the change in spending in response to these income shocks provides an estimate of the MPC.

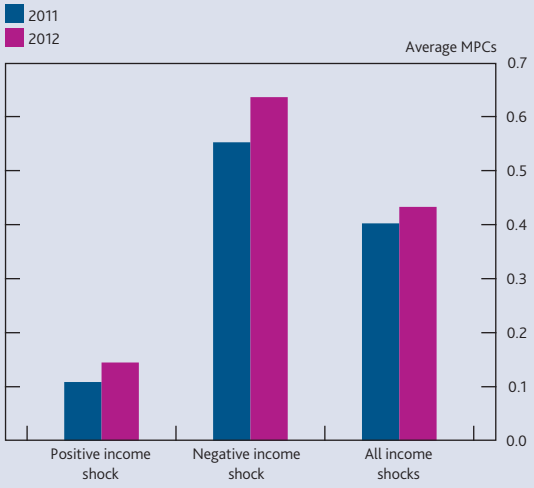
The 2012 survey suggests that there are asymmetric responses to positive and negative income shocks, confirming last year's findings (**Chart A**). Households in the 2012 survey have an average MPC of 0.43. Splitting this by the direction of the shock, households have marginal propensities to consume out of positive income shocks of 0.14 and 0.64 out of negative income shocks.

MPCs may be higher for negative income shocks because it is harder for households to smooth through unexpected falls in income than it is to smooth through increases, particularly if they are credit constrained. By limiting the sample to those households reporting a negative income shock that also reported that they had been put off spending due to a lack of available credit, the average MPC increases to 0.75. Those who are credit constrained are also likely to be on lower incomes. Across income groups, households with lower incomes display higher marginal propensities to consume out of negative income shocks (**Chart B**).

The 'permanent income hypothesis' suggests that households make spending decisions based on their average income over a long period of time rather than on their income in the current period. That implies that the marginal propensity to consume out of an unexpected change in income should be smaller when the shock is perceived to be temporary — rather than permanent — because average income in the future will be less affected.

Responses to a new question in the 2012 survey support the hypothesis that MPCs are lower for temporary income shocks than for permanent ones, although the difference is relatively

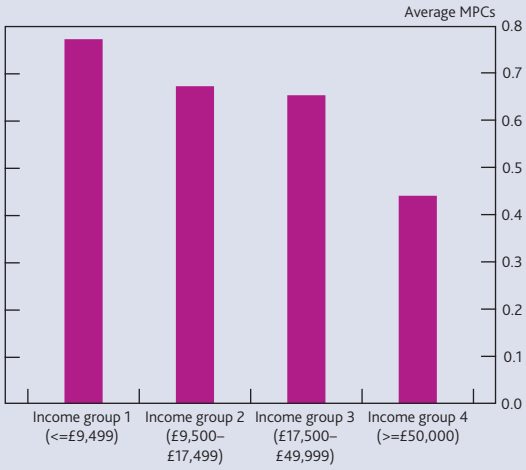
Chart A Average marginal propensities to consume(a)(b)



Sources: NMG Consulting survey and Bank calculations.

(a) Questions: 'Compared to what you expected this time last year, how much more/less money did your household receive over the last twelve months? Please specify an approximate amount in pounds'. 'You indicated earlier in the survey that your household received £x more/less over the last twelve months than you had expected a year ago. By how much did you increase/decrease your annual spending in response to this?'.
(b) MPCs greater than one and less than zero are excluded.

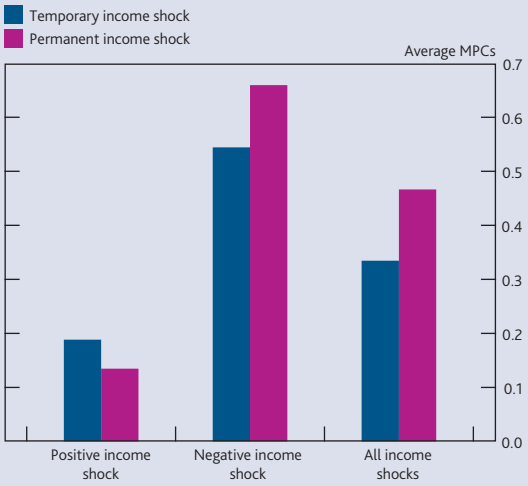
Chart B Marginal propensities to consume out of a negative income shock by income group(a)(b)



Sources: NMG Consulting survey and Bank calculations.

(a) Question: 'Which of these ranges comes closest to the total annual income of the whole of your household, before anything is deducted for tax, national insurance, pension schemes etc?'.
(b) MPCs greater than one and less than zero are excluded.

Chart C Marginal propensities to consume by temporary or permanent income change[a][b]



Sources: NMG Consulting survey and Bank calculations.

(a) Question: 'Are you treating this unexpected increase/decrease in money received by your household as: a temporary increase/decrease, an increase/decrease that is likely to persist?'.
(b) MPCs greater than one and less than zero are excluded.

modest. Restricting the data to changes in income that households perceive to be temporary reduces the average MPC to 0.33, while including only permanent changes in income yields an average MPC of 0.47 (**Chart C**). That aggregate result is driven by responses to negative income shocks. The MPC out of a positive permanent income shock was marginally smaller than the MPC out of a positive temporary shock, but the number of households reporting that they had experienced positive temporary income shocks was small.

Table B Impact and expected impact of fiscal measures on households[a][b][c]

Percentages of households

	Impact over the past year		Expected impact in the future	
	2011	2012	2011	2012
Those affected	**52**	**48**	**76**	**70**
How affected:[b]				
Higher taxes	21	22	39	40
Lower income[c]	21	n.a.	33	n.a.
Lower pre-tax employment income[c]	n.a.	6	n.a.	9
Less spending on services used	16	17	26	27
Lower benefits	11	14	19	21
Loss of job	6	6	22	22
Not heavily affected	**38**	**41**	**15**	**19**
Had not thought about it	**10**	**11**	**10**	**10**

Sources: NMG Consulting survey and Bank calculations.

(a) Questions: 'In 2010, the government announced a set of measures in order to cut the country's budget deficit. Some of these measures have already come into effect. How have these measures affected your household over the past year?'. 'Some of the government's measures will come into effect over coming years. Which of the following are you most concerned about for the future?'.
(b) Impacts may not sum to totals since households could choose up to three effects.
(c) The possible response to this question changed marginally between 2011 and 2012 surveys. 2012 survey refers to 'Lower pre-tax employment income' while 2011 survey refers to 'Lower income'.

than a material easing in the squeeze on incomes:[1] households indicating that they had been affected by the fiscal consolidation reported a similar average fall in monthly available income in both years.

In the 2012 survey, households continued to expect the impact of deficit-reducing measures to be larger in the future than over the past year. Higher taxes were most frequently reported as the way in which households expected to be affected in future (**Table B**), despite no announcement of significant future tax increases. Compared to households receiving the majority of their labour income from the private sector, households working in the public sector were more likely to expect to be affected through lower income or losing their job.

Almost two thirds of households affected by the fiscal consolidation had taken some action over the past year in response (**Table C**). Among these, the most frequently reported responses have been to increase saving (23%), work longer hours (22%) and look for a new job (21%). The proportion of households reporting that they will take action in future declined marginally in the 2012 survey, from 65% to 61%. Of the households planning to increase saving at some point in response to the consolidation, only around half reported that they planned to save more over the next twelve months. That may indicate that households intend to increase saving over an extended period of time or that increasing saving in response to the consolidation is more of an aspiration.

Overall, the past impact and expected future impact of the continuing fiscal consolidation remained broadly similar between 2011 and 2012. While some households are saving more in response to the consolidation (11% of all households), it appears to have been a less important driver of saving than tight credit conditions and concerns about debt.

Uncertainty about income

A new question in the 2012 survey explores the extent to which households' uncertainty about future income has

(1) The question changed to reflect income surprises not just in the month of the survey but over the course of the past twelve months.

(1) Respondents to the 2011 survey could select 'Lower income'. This was changed in the 2012 survey to 'Lower pre-tax income'.

Table C Actions and likely actions taken in response to the fiscal measures[a][b]

Percentages of households

	Actions taken over the past year		Likely action in the future	
	2011	2012	2011	2012
Responded/will respond	**65**	**60**	**65**	**61**
Type of response:[c]				
Look for new job	23	21	29	26
Work longer hours	21	22	27	26
Save more	17	23	28	32
Spend more	5	5	2	2
Not responded/ will not respond	**35**	**40**	**35**	**39**

Sources: NMG Consulting survey and Bank calculations.

(a) Questions: 'Which, if any, of the following actions have you taken in response to these measures?'. 'Which, if any, of the following actions will you take in response to these measures?'.
(b) Actions questions were not asked to those households who reported that they 'had not thought about it' to the effects questions in **Table B**.
(c) Types of response may not sum to totals since households could choose up to three types of response.

changed. Compared to the same time last year, 41% of households reported that they were more concerned about the chance of a fall in income over the next twelve months, suggesting that they have become more uncertain about their future incomes.

Increased uncertainty about the path of future income may have encouraged households to save more as a precautionary measure. That is not, however, borne out in the data: as shown by the orange bars in **Chart 8**, households who have become more uncertain actually display lower saving ratios. That does not seem to be related to households' ability to save, as a similar pattern of lower saving rates among uncertain households is evident within income groups. As the survey did not directly ask how any change in uncertainty had affected saving, it is possible that households had nonetheless saved more than they otherwise would have if they had not become more uncertain. And some households may have become more concerned about a fall in income precisely because of their low saving rates.

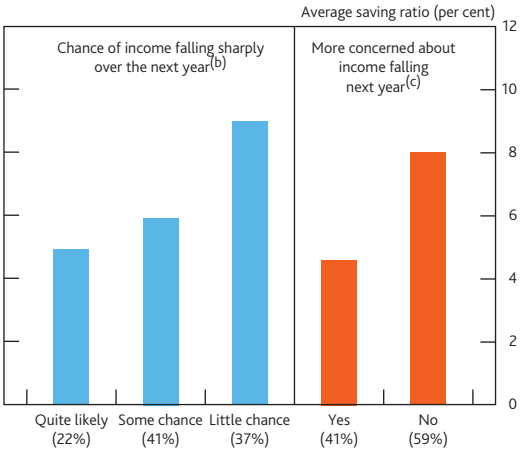
The extent to which households are uncertain about their income differs across age groups (**Chart 9**). Nearly half of households in the prime working-age groups (35 to 44 and 45 to 54) were more concerned about a sharp fall in income over the next year. In contrast, only 28% of households aged over 65 reported feeling more concerned. That may be related to older households being less likely to be in work and having a greater reliance on guaranteed pension incomes.

Prospects for spending and saving

Many of the factors that have affected spending and saving over the recent past are likely to persist in the near term. Real income growth is likely to only recover gradually; households may want to reduce debt levels further; the fiscal consolidation is set to continue; uncertainty may persist; and, although there may be some easing in credit conditions following the introduction of the FLS, credit availability is likely to remain tighter than before the crisis. In the survey, households were asked how they expect their saving to change over the next year and they were asked to give the main reasons for any expected changes.

Households expect to save slightly more over the next year than they have done over the past year. Twenty-eight per cent of households said that they plan to increase the amount that they save next year, while 13% said that they would save less. But among those planning to save more, the average planned increase in monthly saving (£103) was smaller than the average decrease (£169). The survey therefore implies only a very modest increase in average saving across all households of £8 a month over the next year. That translates into

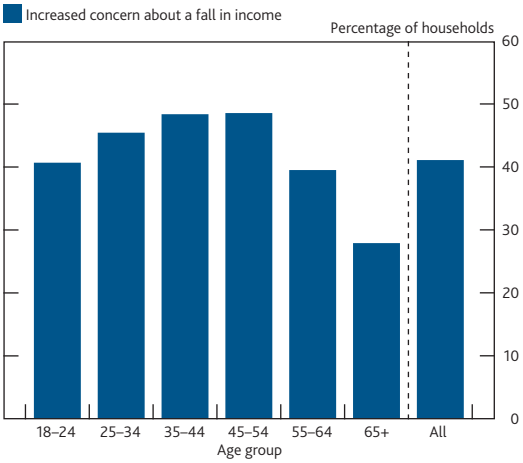
Chart 8 Income uncertainty and saving[a]



Sources: NMG Consulting survey and Bank calculations.

(a) Excludes households whose minimum possible saving exceeds their maximum possible pre-tax income. The saving ratio is defined as monthly saving divided by monthly pre-tax income. Numbers in parentheses show the percentages of respondents.
(b) Question: 'To the best of your knowledge, how likely is it that your household income will fall sharply over the next year or so (for example, because you or someone in your household are made redundant)?'.
(c) Question: 'Are you more concerned now than a year ago, that your household income will fall sharply over the next year or so?'.

Chart 9 Income uncertainty by age[a]



Sources: NMG Consulting survey and Bank calculations.

(a) Question: 'Are you more concerned now than a year ago that your household income will fall sharply over the next year or so?'.

a small increase in the aggregate saving ratio of around 0.3 percentage points.

Tight credit conditions (leading to greater saving for big items and house deposits) and deleveraging (saving to reduce debts) were the most commonly cited reasons why households plan to increase saving over the next year (**Table D**). These echoed the main reasons why households expected to raise saving in the 2011 survey.

Table D Reasons for planning to increase monthly saving over the next year[a][b]

Percentages of households

	2011	2012
Saving for big item	38	36
Reduce debts	27	34
Saving for a house deposit	22	27
Personal commitments	24	26
Increased income	19	22
Retirement	17	14
Worried about redundancy	15	12
Worried about interest rate rises	8	8
Future tax rises	8	6
Euro-area developments	n.a.	6
Less guaranteed monthly income	3	5
Lower mortgage repayments	6	5
Value of assets fallen	4	2

Sources: NMG Consulting survey and Bank calculations.

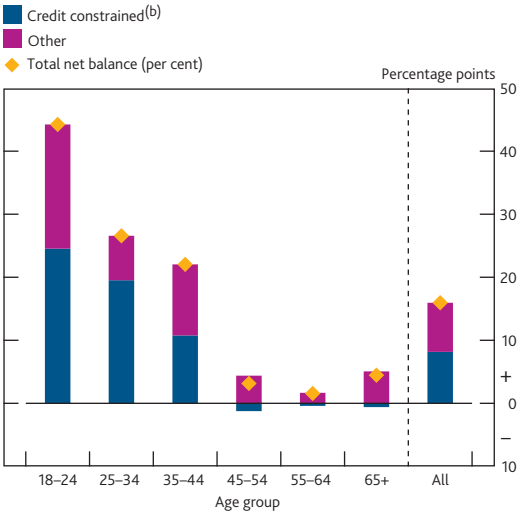
(a) Question: 'What would you say are the main factors driving this increase?'.
(b) Percentages of households that are planning to increase saving. Percentages do not sum to 100 because households could choose up to four reasons.

Only a small proportion of households said that they were planning to increase saving because they were worried about redundancy or about economic developments in the euro area, perhaps suggesting that uncertainty is unlikely to be an important factor boosting saving over the next year. Euro-area developments may, however, affect saving by contributing to the tightness of credit conditions and consequently encouraging people to save for big items and/or a house deposit, which are expected to be big drivers of saving. Concerns about tax increases and saving for retirement also appear to only have a relatively small role in explaining why households plan to increase saving over the next year, although they could be more important in explaining the level of saving than the expected change in saving.

Many of the households expecting to increase saving over the next year are in younger age groups (**Chart 10**). In part, that may be related to the normal life cycle of saving, but these households are also the ones that have been most affected by tight credit conditions. Around 60% of those under the age of 35 who were expecting to increase saving over the next year had also been affected by credit constraints.

Among the households that expected to reduce their saving over the coming year, most were being forced to save less

Chart 10 Contributions to the net balance of households planning to increase saving next year by age[a]



Sources: NMG Consulting survey and Bank calculations.

(a) Question: 'Over the next year, are you planning to change the amount you save?'.
(b) Credit-constrained households are defined as those who have been put off spending because they are concerned that they will not be able to get credit when they need it or who would like to buy a property but have been unable to obtain a mortgage because of the deposit requirement.

because of lower income or rising costs for essential items (**Table E**). Rising costs of essential items appear more important in pushing down expected saving over the next year in the 2012 survey than in 2011. Only a small proportion of households reported that they planned to reduce saving over the next year because they had already built up a sufficient stock of savings, indicating that relatively few households are actively choosing to save less.

Table E Reasons for planning to decrease monthly saving over the next year[a][b]

Percentages of households

	2011	2012
Higher cost of essentials	43	57
Lower income	37	39
Low interest rates	18	23
Bought what saving for	16	11
Have enough savings	9	10

Sources: NMG Consulting survey and Bank calculations.

(a) Question: 'What would you say are the main factors driving this decrease?'.
(b) Percentages of households that are planning to decrease saving. Percentages do not sum to 100 because households could choose up to four reasons.

Conclusion

The 2012 NMG survey shows that nominal incomes have been broadly flat over the past year, and rises in prices will have eroded the spending power of that income. Households on low incomes are more likely to have seen their income fall and a number of households remain uncertain about their future incomes.

Tight credit conditions and concerns about debt levels appear to be two important factors that have supported household saving over the past year. The fiscal consolidation has also boosted saving to a smaller extent, but there is less clear evidence that those who are uncertain about their future incomes have saved more.

The survey implies that the household saving ratio is likely to remain broadly flat over the next year. That would be consistent with a small rise in spending if nominal incomes grow modestly. The survey suggests that the factors that have supported saving over the past year, such as tight credit conditions and concerns about debt levels, are likely to continue to encourage households to save over the next year, although, to the extent that the FLS eases credit conditions, that may encourage households to increase spending relative to their current expectations.

References

Bell, V and Young, G (2010), 'Understanding the weakness of bank lending', *Bank of England Quarterly Bulletin*, Vol. 50, No. 4, pages 311–20.

Churm, R, Leake, J, Radia, A, Srinivasan, S and Whisker, R (2012), 'The Funding for Lending Scheme', *Bank of England Quarterly Bulletin*, Vol. 52, No. 4, pages 306–20.

Dayan, Y, Paine Schofield, C B and Johnson, A J (2007), 'Responding to sensitive questions in surveys: a comparison of results from online panels, face to face and self-completion interviews', World Association for Public Opinion Research, Berlin.

Kamath, K, Nielsen, M, Radia, A and Reinold, K (2011), 'The financial position of British households: evidence from the 2011 NMG Consulting survey', *Bank of England Quarterly Bulletin*, Vol. 51, No. 4, pages 305–18.

Nielsen, M, Pezzini, S, Reinold, K and Williams, R (2010), 'The financial position of British households: evidence from the 2010 NMG Consulting survey', *Bank of England Quarterly Bulletin*, Vol. 50, No. 4, pages 333–45.

The role of designated market makers in the new trading landscape

By Evangelos Benos and Anne Wetherilt of the Bank's Payments and Infrastructure Division.[1]

Designated market makers (DMMs) have traditionally been a source of liquidity for exchange-traded securities and financial contracts. Recent regulatory and technological developments, however, have changed the environment in which DMMs operate, raising questions about their place in the new trading landscape. This article discusses the role and challenges of DMMs in today's trading venues.

Introduction

A designated market maker (DMM) is an intermediary who has been contracted by a trading venue to stand ready to trade a financial security or contract against its own inventory. While other market participants, known as market makers (MMs), may also carry out this role on a voluntary basis, DMMs do so in a formal capacity and in a contractually agreed way.

Some financial markets, for example the market for foreign exchange and many markets for derivative contracts, rely almost exclusively on dealers to act as MMs. Others — such as the markets for equities — combine DMMs with a 'public limit order book' where any investor can be a liquidity provider. This article is about this latter type of market and the specific role of DMMs.

DMMs contribute to liquidity and price efficiency. Both of these are key ingredients of a well-functioning capital market: in their absence, investors fail to allocate capital to the entrepreneurs who will put it to best use. In extreme instances of illiquidity and price instability, market participants may flee capital markets, potentially compromising those markets over extended periods. To the extent that they help mitigate this risk, DMMs can contribute directly to financial stability.

DMMs have traditionally been an important component of the microstructure of trading venues worldwide.[2] Almost all the stock exchanges of the major industrialised countries feature DMMs.[3] The widespread and sustained existence of this role and its endurance over time is suggestive of its perceived usefulness in providing liquidity.

In the current trading environment, however, DMMs face various challenges resulting from a number of technological and regulatory changes. For example, many markets have become dominated by computer-based trading, often executed at high speeds. As a result, DMMs face competition from high-frequency traders who act as *de facto* liquidity providers but have the option to enter and exit the market at will. At the same time, the appearance of new trading venues has dispersed traders and fragmented liquidity.

Market-making requires capital and so it is also impacted by broader changes in the regulatory landscape, including forthcoming changes in banks' capital requirements and proposed restrictions on proprietary trading. These changes will, of course, affect only DMMs and MMs that are subject to prudential capital regulation.

Together, these developments have challenged the business model of DMMs by eroding some of the benefits that they have traditionally enjoyed as a compensation for their services. In turn, this has led many to question whether DMMs are still relevant and necessary. Indeed, some exchanges have been diluting or eliminating some of DMMs' obligations. At the same time, market-making obligations are being built into new European market regulation,[4] suggesting that the DMM debate is ongoing.

This article starts by discussing the concepts of liquidity and price efficiency and highlights the positive externalities associated with each. The next section describes the basic features of market-making. The article then explains how DMMs can uphold liquidity and price efficiency and discusses

(1) The authors would like to thank William Abel, Satchit Sagade and Filip Žikeš for their help in producing this article.
(2) Market makers (also known in the past as 'jobbers') were, for example, active in the last quarter of the 18th century in the market for English government consols, where certain brokers seemed to have been profiting from the difference between the bid and offer prices of these consols (see Attard (2000)). The London Stock Exchange has employed official market makers at least since the beginning of the 19th century (Neal and Davis (2006)).
(3) Only the Tokyo Stock Exchange relies exclusively on public order flow for liquidity in stocks. See Charitou and Panayides (2009).
(4) The issue of DMM obligations is being discussed by European regulators in the context of the revision of the Markets in Financial Instruments Directive.

the risks faced by DMMs. The following sections set out some of the challenges faced by DMMs in today's trading landscape and discuss some possible policy responses to these. The final section concludes.

Liquidity, price efficiency and externalities in financial markets

A well-functioning capital market is one that efficiently allocates resources in the economy: it brings together investors and entrepreneurs so that capital is allocated in a way that balances risks and returns. At the 'micro' level of security trading, this implies that trading costs are moderate(1) and that there is always an option to trade so that market participants need not worry about trade execution delays. Such a market is considered **liquid**. At a more 'macro' level, it implies that prices reflect fundamental values so that capital flows to investments with higher expected returns for a given amount of risk. Such a market is considered **efficient**. A well-functioning market, then, is associated with both liquidity and efficiency.

Both liquidity and price efficiency have positive externalities. Liquidity, for example, is associated with what economists call a 'network externality': the more liquid a market is, the easier it is to trade in that market — and so the more attractive that market becomes to individuals who want to trade. This further increases its liquidity. Price efficiency, on the other hand, has the properties of a public good because prices contain information that is both valuable and freely available to everyone: a trade that contributes to price discovery does not only benefit the counterparties involved but also the rest of the investing public.(2) Price efficiency can also be linked to the level of investor participation: the greater the number of informed market participants, the larger the amount of information that prices incorporate.

To the extent, then, that liquidity and efficiency are associated with positive externalities, the private benefit of market participants does not capture the full social benefit of an efficient and liquid market. In other words, market participants are not compensated for the wider benefits that their participation brings about.

Standard economic thinking would suggest, then, that a *laissez-faire* regime will fail to provide the right incentives for market participants to contribute to liquidity and efficiency at a level that maximises social welfare.(3) This justifies some kind of policy intervention to ensure that markets remain liquid and efficient at a socially optimal level. This holds under 'normal' market conditions, but becomes more obvious in 'abnormal' (or 'stressed') market conditions where liquidity dries up and efficiency is compromised.

Such liquidity dry-ups and price dislocations can result from a number of factors. Some of these are listed below. In all cases, markets become one-sided: sellers fail to find buyers unless they accept unusually large price discounts, and the liquidity dry-up brings about a price dislocation.

(a) **Asynchronous trading needs**: A standard friction inherent with trading is that counterparties do not always arrive at the market at the same time. This means that they may not be able to find each other and conclude a trade. This cause of illiquidity is typical for thinly traded assets, for example, small-capitalisation stocks.

(b) **Investor sentiment**: In some cases, large price dislocations reflect a major revision of the fundamental value of assets. In other cases, however, they can result from order imbalances caused by changes in investor sentiment. An example of this was the burst of the 'dotcom' bubble in March 2000.(4)

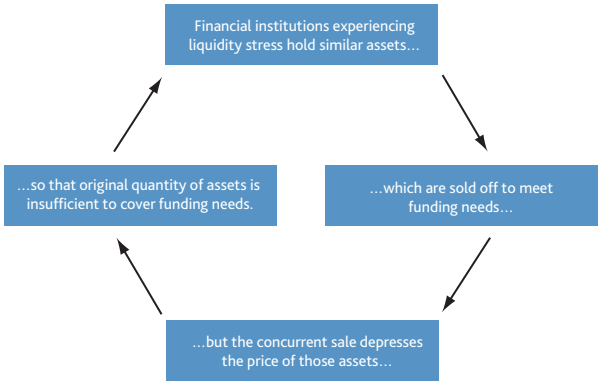
(c) **Price feedback loops**: There are also various ways through which price pressures can become self-reinforcing. And, depending on the mechanism that generates them, these feedback loops can affect a single or multiple markets.(5) Here we give an example of each case.

Risk feedback loop: This feedback loop may occur when institutions with acute funding needs hold similar tradable assets. If they sell these assets at the same time — as they attempt to satisfy their funding needs — the market for these assets may become one-sided and the value of the assets will drop. This, in turn, may force the institutions to sell even more of these assets thus creating a feedback loop by further exacerbating market illiquidity and the initial funding liquidity problem.(6) **Figure 1** illustrates this feedback loop.

Cross-market feedback loop: This is a type of feedback loop that involves multiple related markets (for example derivatives and underlying securities or indices and individual index components): an initial liquidity shock — an order imbalance — in market A causes a price dislocation in that market, rendering prices less

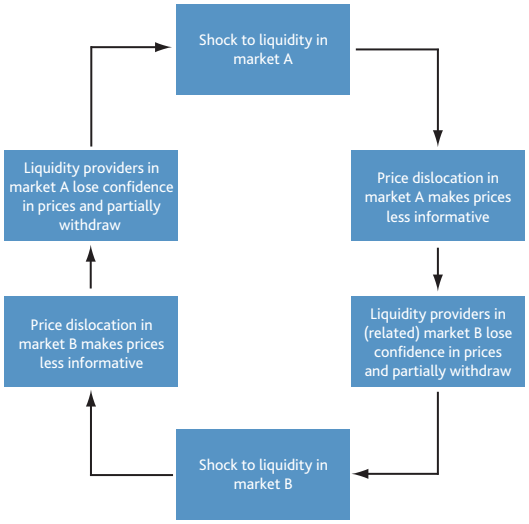
(1) Trading costs include broker and transaction fees, the bid-ask spread as well as the potential price impact of a given trade.
(2) An illustration of the value of information produced by trades is the usage of interest rate swap prices to construct the term structure of interest rates which in turn is used to price corporate bonds, mortgage-backed securities and other credit instruments. See Fleming (2000).
(3) See Dodd (2002) for a comprehensive discussion of the various externalities and the rationale for regulation in financial markets in general.
(4) The 'dotcom' bubble was a speculative bubble that occurred between 1997 and 2000 in the stock markets of most industrialised nations and was primarily driven by the communications, technology and internet sectors. In the United States, the NASDAQ composite index peaked on 10 March 2000 before falling by around 10% in the following ten days.
(5) For a detailed description of the types of price feedback loops that may arise, see Zigrand, Cliff and Hendershott (2012).
(6) See Brunnermeier and Pedersen (2009) for a theoretical exposition. Khandani and Lo (2011) find evidence of such a risk feedback loop among professional US investors in the summer of 2007.

Figure 1 A 'risk' feedback loop



informative. This causes liquidity providers of a related market B to be less certain about the prices they should be quoting in market B and, as a result, to withdraw partially from that market. This makes market B vulnerable to price dislocations and its prices less informative. This then feeds back into market A, where liquidity providers become more uncertain about prices and further reduce liquidity provision.(1) **Figure 2** illustrates this feedback loop.

Figure 2 A 'cross-market' feedback loop



(d) **Technological mishaps**: The rise in the use of computers and algorithms in the trade process means that trading is increasingly prone to algorithmic or other so-called 'fat finger' errors. In practice, this means that large quantities of a security or financial contract may be traded within a very short period of time, causing the market to become one-sided and prices to move sharply.

Importantly, the factors listed above can reinforce each other. Indeed, the 6 May 2010 'Flash Crash' in the US markets — when the Dow Jones index dropped by around 9% and then recovered these losses in the space of a few minutes — has become the archetypal example of what can go wrong in the modern trading environment. There are a number of potential explanations for the Flash Crash, involving different kinds of technological failures that may have triggered different types of feedback loops.(2) The increasing number of 'mini crashes' in equity markets as well as foreign exchange and commodity futures markets, where trading is becoming increasingly computerised, suggests that technological mishaps combined with other factors are a genuine source of liquidity dry-ups.(3)

The 'microstructural' arrangements that trading venues have in place can play a role in reducing the loss of liquidity and the resulting mispricing of assets. These arrangements may include circuit breakers, price limits, call auctions and designated market-making schemes. The rest of the article focuses on the efficacy and usefulness of the latter.

What is a designated market maker?

Market makers (MMs) are intermediaries, with an inventory in a given security or financial contract, who continuously provide price quotes at which they are willing to buy and sell that security or contract. They make money by buying low (at the 'bid' price) and selling high (at the 'ask' price). In other words, MMs are rewarded for giving investors the option to trade against them on a continuous basis; that is, they are a source of liquidity.

MMs provide liquidity by posting ***limit orders*** — commitments to buy or sell a certain amount of financial securities or contracts at a specific, quoted, price. By listing these orders on the so-called 'public limit order book', they *supply* liquidity by giving investors the option to trade. MMs may also use ***market orders***. These are executed against standing limit orders with a price priority, meaning that the limit orders with the best quoted prices are executed first. By being executed against standing limit orders, market orders effectively decrease the available trading options and, as such, *consume* liquidity.(4)

MMs are active in stock exchanges and various other markets, including those for futures and options, government and corporate bonds, over-the-counter derivatives and foreign exchange products. They may be the only sources of liquidity, or they may complement a public limit order book on which anyone can provide liquidity.

(1) See Cespa and Foucault (2012) for a theoretical exposition.
(2) For the official account of the 6 May 2010 Flash Crash, see CFTC-SEC (2010). For an alternative account, see Nanex (2010).
(3) See, for example, Hwang, Kisling and Mehta (2012) for a description of recent mini crashes in the shares of IBM and Coca Cola, and Meyer (2011) for a description of a crash in ICE-traded cocoa futures.
(4) In markets with a public limit order book public investors, alongside MMs, can submit limit orders and market orders.

In some markets, MMs act voluntarily, attracted by the opportunity to profit. But in many cases, market-making is institutionalised: MMs enter into a formal agreement either with the trading venue or with the firm whose securities MMs are to trade. These designated market makers (DMMs) undertake to provide their services in a continuous and consistent manner in exchange for certain benefits and rewards. Their obligations may vary from one market to another, but several basic obligations are common. These are:

- **Trade continuity**: obligation to quote prices for a fixed part of the trading day.
- **Maximum spread**: obligation to maintain a bid-ask spread that does not exceed a pre-specified limit. In equity markets, the maximum spread is often a fixed percentage of the stock price.
- **Price continuity**: obligation to avoid large quote revisions.(1)
- **Minimum quoted size**: obligation for quoted price to be valid for a minimum number of shares/contracts.

These obligations are intended to enhance the liquidity and efficiency of the market and the next section explains in more detail how this is achieved. By observing these rules, however, DMMs lose money under certain market conditions. Therefore, in return for fulfilling their obligations, DMMs are typically rewarded in one or more of the following ways:

- **Monetary rewards**: they might be excused from trading fees and/or earn a stipend.
- **Market power**: they might be granted market power in the sense that there is a limited number of DMMs active in each security or contract.
- **Other benefits**: they might be allowed to have an advance look at all incoming orders on the limit order book. This benefit enables them to better assess demand and supply, in the immediate future, and extract useful information about the market before posting their own quotes.(2)

As an illustration, the box on page 347 lists the obligations and benefits of DMMs on the various London Stock Exchange platforms.

In economic terms, then, a DMM scheme effectively provides **intertemporal liquidity insurance**: market participants pay DMMs an insurance premium in good times in return for some degree of trade and price continuity in bad times. This means that DMMs will usually be making money from the bid-ask spread and the various benefits listed above. At times of high price volatility, however, their obligations are likely to bind and these are times when they are likely to lose money.(3) Provided, however, that the present value of their expected income exceeds the present value of their losses, being a DMM will be a profitable and viable business activity.

Why are DMMs useful and what risks do they take?

The role that DMMs fulfil

DMMs' **trade continuity** obligation solves the problem of asynchronous trading needs, highlighted in the first section of this article. They solve this matching problem by allowing buyers and sellers to trade against the DMMs' inventory.(4) In equity markets, synchronisation is mostly a problem with small-capitalisation stocks which may have only a few trades per day. It is for this reason that, in many exchanges, trading in 'small-cap' stocks is almost exclusively facilitated by DMMs.

In addition to providing liquidity on a continuous basis to 'chronically' illiquid securities or contracts, DMMs can also be useful in markets for securities or contracts that have a large, liquid, order book. This is because, as explained above, even markets that are usually liquid can experience episodes of acute order imbalances and extreme price dislocations. In these circumstances, DMMs can contribute to maintaining price efficiency through their **price continuity** obligation. In case of a sizable intraday price swing, this means that DMMs will have to trade against the price trend and take losses. This, in turn, implies that they may delay the price change and thus reduce intraday volatility.

But is this 'volatility dampening' a good thing? On the one hand, one could argue that it hinders price discovery whenever prices move in response to changes in fundamentals, such as news about a company's future profitability. On the other hand, as mentioned in the second section, large price swings may also result from changes in investor sentiment, from some unintended feedback loop or from an algorithmic error. In these instances, volatility dampening effectively puts the breaks on the market and gives more time to investors trading on economic fundamentals to step in and correct the mispricing before a large price dislocation can materialise. Reducing the frequency and severity of price dislocations that are not justified by fundamentals can then boost investor confidence and translate into higher participation rates and increased liquidity and efficiency over a longer time horizon. **Figure 3** illustrates this beneficial impact of DMMs on liquidity and price efficiency. Overall, *properly calibrated* DMM schemes can help prevent the virtuous circle of efficiency and liquidity from degrading into a vicious circle of mispricing and illiquidity.

(1) For example, if the price of a stock is to drop from £4.00 to £3.85 and the minimum amount by which the price can change (the 'tick size') is £0.05, this rule would require the DMM to buy a minimum amount of shares at £3.95 and £3.90. This would effectively slow down the price movement.
(2) For example this is a benefit that New York Stock Exchange (NYSE) 'specialists' (the old name of NYSE DMMs) used to have until 2008.
(3) The 'price continuity' rule requires that a DMM trades for some time against the price trend (for example, being required to buy when the price is falling). If the price trend ends up being significant and persistent then the DMM will lose money on these trades. More generally, DMMs lose money when they are constrained by their market-making obligations (Panayides (2007)).
(4) See Demsetz (1968).

Designated market-making on the London Stock Exchange

Becoming a DMM

Any London Stock Exchange (LSE) member who can commit to the DMM obligations described below can apply and be admitted as a DMM. The DMM suitability criteria are otherwise the same as the exchange membership criteria.

Obligations

The LSE consists of multiple market structures. Most of them feature DMMs whose obligations vary depending on which market structure they are present in.

- **Hybrid SETS market**:(1) A DMM must maintain an executable quote, in each security for which it is registered, for at least 90% of the time every day and for the duration of the closing auction until market close, including any extensions. DMMs do not have to maintain a quote during the opening auction or if continuous trading has been suspended. The 10% of the time when the DMM has the right to stop providing quotes is of the DMM's choosing. DMMs are also subject to maximum spread and minimum quote size rules, the parameters of which vary across stocks.
- **Quote-driven SETSqx and SEAQ markets**:(2) A DMM must always maintain a firm quote in each security for which it is registered. However, DMMs are not subject to maximum spread rules.
- In all cases, a DMM may not de-register from a security within three months of its initial registration or re-register within three months of de-registration with respect to the same security. This is to prevent DMMs from withdrawing when markets are stressed.

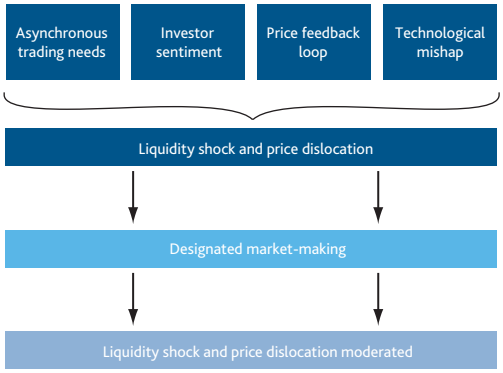
Benefits

LSE DMMs have the following benefits:

- They incur no trading fees.
- On the request of a DMM, the exchange may suspend or vary market-making obligations (relax spreads) when prices are volatile.

(1) SETS is the main electronic order book of the LSE. It is where the FTSE 100 and FTSE 250 stocks, among others, are traded.
(2) SETSqx is an LSE trading service for stocks less liquid than those traded on SETS. It features a periodic electronic auction book along with DMMs. SEAQ is the LSE's venue for trading stocks of smaller market capitalisation. It does not have a public limit order book and instead liquidity is exclusively provided by DMMs.

Figure 3 Illustration of the role of DMMs in upholding liquidity and price efficiency



It is perhaps not surprising, then, that the empirical evidence suggests that the introduction of DMMs in various exchanges has been associated with significant reductions in liquidity premia (defined as the additional return demanded by investors for holding a less liquid asset), especially in less liquid securities or contracts. The box on page 348 briefly reviews this evidence.

While DMM schemes improve market quality, market-making can only be a viable business if it is profitable. One problem in assessing this, however, is that DMM profits and losses can be volatile and difficult to predict, especially at times of stress. The next subsection discusses the risks associated with market-making.

Risks that DMMs take

Market-making is an inherently risky business. Principally, there are two types of risks that DMMs face: the first is **adverse selection risk** — the risk of trading against informed investors. Informed investors can more accurately predict how prices will move in the immediate future. Thus, following a trade, prices usually move in the opposite direction from that which DMMs would like (for example, prices drop after a DMM buys a financial contract from an informed trader). This forces DMMs effectively to trade at a negative spread — buy 'high' and sell 'low' — which loses them money. It is for this reason that DMMs prefer, whenever possible, not to trade with informed traders.

The second type of risk — which is more relevant for this article — is **inventory risk**. When prices fluctuate, so does the value of the DMM inventory — and the larger the inventory, the larger the value at risk for the DMM. It is therefore not surprising that in stressed market conditions, DMMs may avoid taking on additional risk and instead try to minimise their activity and market exposure. Nevertheless, despite reducing their activity, DMMs will often continue to play an important role in providing liquidity. This is also illustrated in the box on pages 350–51, which shows the risks borne by a group of DMMs during a period of market stress and how these risks affect their market-making behaviour.

Occasional but severe market swings in DMMs' profits can deplete their capital and drive them out of business. Trading

Evidence on the impact of introducing DMMs into a stock market

What happens to stock prices and liquidity when a DMM is introduced into a stock market? Over the years, exchanges around the world have introduced various types of DMMs and these changes have been used by academics as natural experiments for assessing the impact of DMMs on market conditions.

Overall, the academic evidence suggests that the market perceives DMMs as 'liquidity enhancing', especially for less liquid stocks. Several studies confirm that upon the introduction of some kind of DMM regime, there is a positive price reaction. Since this is usually accompanied by an improvement in liquidity measures, the price reaction is interpreted as a reduction in the liquidity premium that the market was demanding under the previous trading regime.

For example, Venkataraman and Waisburd (2007) empirically test the impact of introducing a DMM to a number of less actively traded stocks in the Paris Bourse between 1992 and 1998. Prior to the introduction of a DMM, these stocks traded exclusively on the limit order book. The authors find that upon the announcement of the DMM introduction, stocks experienced both a cumulative abnormal return(1) of 5% and a significant decline in order book imbalances.

Menkveld and Wang (2009) examine the stock price reaction of 74 Euronext-traded, small, Dutch firms which contracted with DMMs that, in turn, committed to supply liquidity throughout the trading day. Contracting with a DMM was introduced for small-cap stocks after the trading model of the Paris Bourse was adopted by the Amsterdam Stock Exchange in October 2001. The stocks in their sample experienced an average abnormal return of about 3.5% in a fifteen-day window around the announcement or effective day of a DMM introduction. Furthermore, the authors find that the DMMs participate in more trades and suffer losses when their contractual obligations are binding. This corroborates the fact that the observed price reaction around the announcement and effective dates reflects a reduction in the liquidity premium.

Similarly, Anand, Tanggaard and Weaver (2009) study the effect of liquidity providers (LPs) on the Stockholm Stock Exchange. They find that LPs are contracted for stocks that experience low volumes, wide spreads and higher information asymmetries. LPs trade against market movements and when spreads are wider. Firms that announce the introduction of an LP experience a cumulative abnormal return of about 7% in the ten days after the announcement of the LP contract. Similar conclusions are reached by Anand and Venkataraman (2012) who find that DMMs on the Toronto Stock Exchange tend to stabilise prices and lower execution uncertainty.

Interestingly, however, increasing the number of DMMs beyond some level, for a given stock, may bring about only marginal improvements in liquidity. Using a sample of stocks traded on the Xetra trading platform of the Deutsche Börse, Hengelbrock (2008) finds that increasing the number of DMMs beyond two has limited impact on liquidity.

Finally, the academic evidence suggests that listed companies themselves also perceive DMMs to be liquidity enhancing and thus to be contributing to a lower cost of capital. Using data from the Oslo Stock Exchange, Skjeltorp and Ødegaard (2010) analyse the reasons why listed firms pay a DMM to maintain an orderly market in the firm's stock. They find that the decision to hire a DMM is related to the probability that the firm will interact with the capital market in the future. In particular, since a DMM improves the stock's liquidity and therefore reduces the cost of capital, firms who plan to go to the market in the future have an incentive to hire a DMM. Consistent with this explanation, the authors find that firms which hire DMMs have better investment opportunities and they indeed tend to issue equity within a year after the DMM deal.

(1) Abnormal returns are returns in excess of what would be expected for the amount of risk that a given security has.

venues therefore do not typically require their DMMs to quote firm prices at *all* times. Instead, the expectation is that, at times of extreme stress, DMMs will withdraw to protect their capital base. For this reason, exchanges usually mandate that DMMs should provide firm quotes for a pre-specified portion of the trading day; and it is up to DMMs to decide which portion of the day they will abstain from their market-making function. Exchanges may also specify that DMM obligations do not apply during a trading halt.

Overall, DMMs cannot guarantee liquidity provision in *all* circumstances and in extremely stressed market conditions they may have no option but to withdraw from a given market altogether. This means that trading venues need additional tools to cope with extreme market stress. Some examples of these are listed in **Table A**. But by contributing to greater liquidity in most circumstances — including times of moderate stress — DMMs can *ex-ante* minimise the frequency and severity of liquidity dry-ups and price dislocations thus improving the overall quality of the market.

Table A Tools used by exchanges to manage market stress

Tool	Description
Cap on the cancellation to order ratio	*Ex-ante* tool; market participants cannot exceed a certain ratio of orders cancelled to orders executed. Imposes a limit on message traffic.
Message traffic fee	*Ex-ante* tool; market participants incur a cost if/when they exceed an upper limit on message traffic. Discourages excessive order submissions and cancellations.
Price limit	*Ex-ante* tool; constrains trading to within a pre-specified, dynamically adjusted price band. Rejects any trades that would result in prices outside of that band.
Short-sale restrictions	*Ex-ante* tool; exchanges may prohibit or constrain short sales under various circumstances. For instance, long-sellers may be given priority over short-sellers or short-selling may be prohibited unless executed at a price higher than the most recent price.
Trade halt	*Ex-post* tool; suspends trading when prices move outside a pre-specified price band within a pre-specified time period.

On top of the traditional risks associated with market-making, the emergence of the new trading landscape — characterised by high-frequency and fragmented trading — has brought about new challenges to DMMs. These are discussed in the next section.

What are the challenges to DMMs in the new trading landscape?

Over the past decade, financial markets have changed in profound and important ways. Regulation 'National Market System' (or 'Reg NMS') of 2005 in the United States and the 'Markets in Financial Instruments Directive' (or 'MiFID') of 2004 in Europe paved the way for the emergence of new trading venues. These led to increased competition in terms of the number of trading venues, but this has also had the effect of fragmenting liquidity. In addition, technological developments have made it possible to trade automatically using algorithms at ever-increasing speeds.

These regulatory and technological developments have eroded the relative value of the privileges that DMMs have traditionally enjoyed. This has happened in a number of ways:

(a) **Trading fees and stipends**: Many exchanges now employ 'maker-taker' pricing schemes that reward any participants who ***provide*** liquidity by posting limit orders and tax those who ***consume*** liquidity by executing market orders. Thus, the benefit of having trading fees waived and/or receiving stipends — that DMMs had uniquely enjoyed in the past — has, in relative terms, diminished.

(b) **Market power**: The market power that DMMs have traditionally enjoyed, both across and within venues, has also been eroded. Fragmentation in trading has brought about competition for market-making *across* venues, shrinking DMM profit opportunities in the traditional venues. Furthermore, technological improvements have made it possible for a wide range of market participants to execute market-making strategies easily and cheaply, increasing market-making competition *within* venues. This has been reflected in the steadily decreasing bid-ask spreads over the past ten years in the world's largest equity markets.(1) Both fragmentation and unofficial market-making have meant that exchanges can no longer guarantee the protection from competition that they had afforded DMMs in the past as part of the contractual arrangement.

(c) **Access to limit order book information**: Fragmentation of markets has reduced the value of having exclusive access to order flow information of a given market that some DMMs have traditionally enjoyed. In the fragmented modern landscape, a significant fraction of order flow has moved to alternative exchanges thus becoming invisible to DMMs in the primary exchanges.

Together, these developments have rendered designated market-making less attractive as a business activity. Corroborating this view, there is evidence that, in some markets, DMMs are less profitable than in the past and that their trading activity has diminished in relative terms.(2)

Moreover, the *de facto* high-frequency market makers that have entered markets following technological advances are free to enter or exit the market at will. This allows them to compete with DMMs when market-making is profitable but withdraw altogether from the market when it is not, leaving DMMs to bear the brunt of market-making obligations in a stressed market.

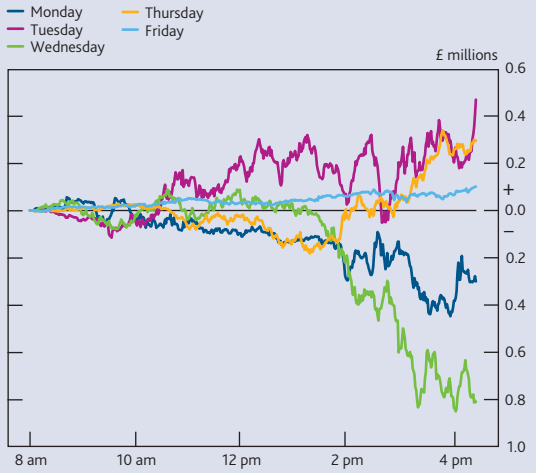
(1) See, for example, Angel, Harris and Spatt (2010), who show that effective spreads on NYSE and NASDAQ-listed stocks have fallen on average by around 50% over the past ten years.
(2) See, for example, Hendershott and Moulton (2010).

Designated market-making in liquid stocks during market stress

Using actual transactions data, this box examines and compares the behaviour of a group of DMMs under different market conditions. In particular, the charts in this box show how a group of stock market DMMs behaves during a 'volatile' and a 'calm' week, in their trading of six otherwise liquid stocks. The two weeks are labelled 'volatile' and 'calm' based on the standard deviation of a broad market index. For confidentiality reasons, we report figures aggregated over multiple DMMs and stocks. Furthermore, we do not report the venues, the names of the stocks, the DMMs or the exact dates on which these charts are based.

Charts A and **B** show the collective cumulative intraday profits and losses of this group of DMMs during the 'volatile' (**Chart A**) and the 'calm' (**Chart B**) week. Each of the five lines represents a different day of the week. The differences between the two weeks are clear and sizable: market volatility exacerbates both DMM profits and losses, suggesting that market-making can become a lot riskier during times of market stress. Furthermore, the fact that DMMs register larger losses during the 'volatile' week suggests that DMMs trade against the price trend and help dampen volatility even in liquid stocks like the ones in our sample.

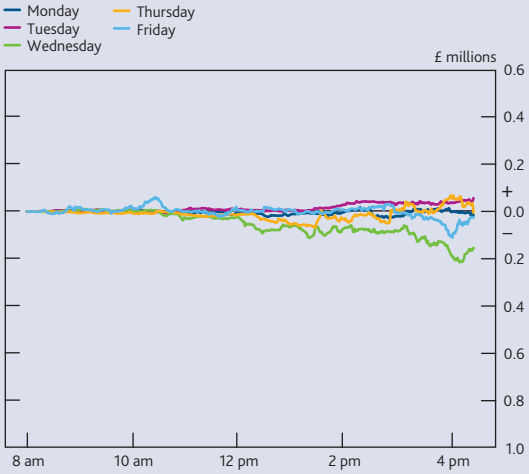
Chart A Intraday profits and losses of DMMs during a 'volatile' week



Sources: Financial market data and Bank calculations. For confidentiality reasons, the trading venues, names of the stocks and exact dates for the data on which these charts are based are not reported. Figures are aggregated over multiple DMMs and stocks.

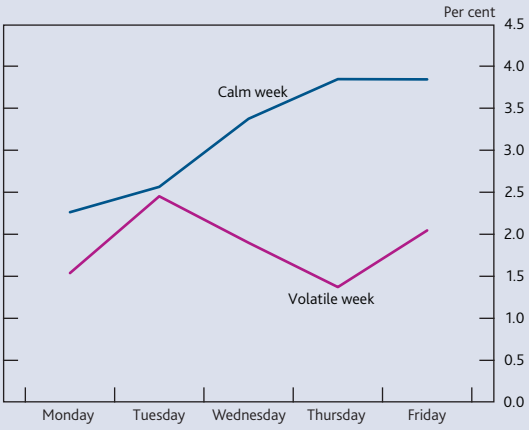
It is perhaps not surprising, then, that the DMMs scale down their liquidity provision during times of stress. DMMs provide liquidity by posting limit orders — that is, by posting orders that rest on the order book for other market participants to trade against. Limit orders are matched with incoming market orders which are executed immediately at the best available price. **Chart C** shows that the amount of passively executed

Chart B Intraday profits and losses of DMMs during a 'calm' week



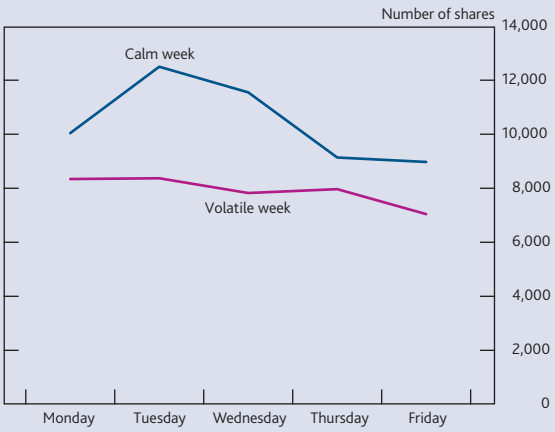
Sources: See **Chart A**.

Chart C Passively executed volume by DMMs as a percentage of total trading volume (executed by all market participants), during a 'calm' and a 'volatile' week



Sources: See **Chart A**.

Chart D Average trade size (in number of shares) of DMMs during a 'calm' and a 'volatile' week



Sources: See **Chart A**.

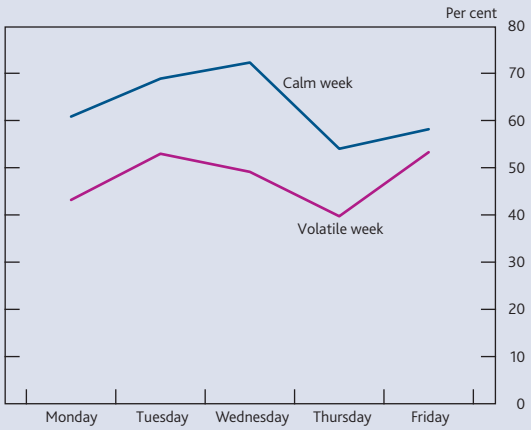
volume (ie the volume traded via limit orders), attributable to DMMs, drops, relative to total trading volume, during the 'volatile' week. This is partly driven by the fact that DMMs

trade in smaller-sized orders during the 'volatile' week (**Chart D**).

DMMs may themselves use market orders when they want to make quick adjustments to their inventory. The need to do so will most likely arise in stressed market conditions. This is confirmed in our data: **Chart E** shows that the DMMs in our sample tend to carry out an increased fraction of their trading via market orders (which shows up as a decreased fraction of passively traded volume) during the 'volatile' week, thus shifting to an extent from pure liquidity provision to active inventory management. This is another reason why the share of passively executed volume attributable to the DMMs drops during the 'volatile' week.

But the figures also show that although DMMs face large risks during the 'volatile' week and although they do (to some extent) scale down their activity, they largely remain active in the market and continue to provide liquidity.(1)

Chart E Passively executed volume as a fraction of total DMM trading volume during a 'calm' and a 'volatile' week



Sources: See **Chart A**.

(1) Since we do not observe the DMMs' quoting behaviour we cannot directly assess DMMs' liquidity contribution and presence in the market. Instead, we infer DMM activity from the actual transactions in which DMMs participate.

Looking ahead, incentives to offer market-making services in general, and designated market-making in particular, may be further affected by upcoming regulatory changes. Banks will face new capital requirements on market and counterparty credit risk. These requirements are likely to lower the return on equity from market-making for banks that engage in such activities. However, the increased capital should also enhance banks' ability to withstand price moves and to provide liquidity to markets during periods of stress. Proposed changes in the structure of the banking sector, aimed at reducing proprietary trading activities, may also affect the ability of banks to act as market makers.(1)

Policy implications: what is the way ahead?

Policymakers are actively debating the role of market-making obligations. On the one hand, the value of DMM privileges has been eroded, raising questions about their ability to provide liquidity, particularly during times of market stress. On the other hand, the social benefits associated with market-making remain valid — perhaps even more so in markets where high-frequency traders act as informal market makers. What, then, are the policy options?

One potential response to the increased set of challenges that DMMs now face is to ease their obligations. This approach was followed by the New York Stock Exchange in 2008, when it ceased having traditional 'specialists' and replaced them with DMMs that had both fewer obligations and fewer privileges. But the drawbacks of this approach became apparent during the 6 May 2010 Flash Crash when DMMs posted 'stub' quotes that were never meant to be executed, thus effectively withdrawing from the market.(2)

An alternative solution is to upgrade the benefits of DMMs — for example by increasing DMM compensation or by giving priority to their orders — while keeping their obligations intact. Proponents of this option point to the improvements in market quality that DMMs can bring about in both normal and stressed market conditions and the positive externalities associated with these improvements.

In designing DMM arrangements, it is important to recognise the risks associated with market-making. This can be achieved by aligning and co-ordinating DMM obligations and benefits with other microstructural features of the exchange in which they operate. For instance, exchanges can specify what DMMs can or cannot do during trade halts and during the auctions that follow such halts. They can also specify what fraction of their orders DMMs can cancel and how quickly they are allowed to do that.

Existing DMM contracts acknowledge that DMMs are unlikely to be present at times of extreme market stress. Yet this is precisely the time when their liquidity contribution would be most needed. Exchanges therefore need to use additional tools during such periods in order to manage stress.

(1) See page 37 of the December 2011 *Financial Stability Report*.
(2) During the Flash Crash some DMMs posted bid prices as low as US$0.01 and ask prices as high as US$99,999.99. Thus, DMMs fulfilled their 'trade continuity' obligation without effectively being present in the market. The 'price continuity' and 'maximum spread' obligations that would have likely prevented this from happening had been removed in 2008. Following the Flash Crash, however, the Securities and Exchange Commission reinstated the maximum spread rule.

A related policy question surrounds *who* should pay for DMMs' benefits. Conceptually, the following (non-exclusive) options are available:

- **Market participants**: Market participants benefit directly from the improvements in liquidity and efficiency that DMMs bring about. They could therefore bear some of the cost of a DMM (effectively in the form of wider spreads).

- **Listed firms**: In the case of equities, the introduction of a DMM has been shown to improve liquidity significantly and therefore reduce the premium that investors demand from a firm's stock. This lowers the firm's cost of capital and increases its value. Therefore, listed firms could also bear some of the cost of supporting a DMM. This is a model that has been successfully tested in the Swedish and Norwegian stock markets.(1)

Conclusion

This article has explained that DMMs with well-designed obligations can play an important role in supporting liquidity and price efficiency in order-driven markets. By committing to buy and sell using their own inventory, DMMs allow market participants to trade in a timely manner and resolve the synchronisation problem that arises in less liquid markets. And by providing price continuity during times of stress, DMMs can also help to make markets that are normally liquid more resilient, efficient and ultimately more attractive to investors. In other words, they can act as the first line of defence when liquidity and price efficiency are challenged.

Today, DMMs face particular challenges, resulting from changes in the trading environment and from regulatory changes. If correctly and fairly designed, market-making schemes can incentivise DMMs to commit to their obligations, while limiting risks to the DMMs in extremely stressful market conditions. Economic rationale suggests that this will also be welfare enhancing.

(1) See Anand, Tanggaard and Weaver (2009) and Skjeltorp and Ødegaard (2010).

References

Anand, A, Tanggaard, C and Weaver, D (2009), 'Paying for market quality', *Journal of Financial and Quantitative Analysis*, Vol. 44, pages 1,427–57.

Anand, A and Venkataraman, K (2012), 'Should exchanges impose market maker obligations?', available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2179259.

Angel, J, Harris, L and Spatt, C (2010), 'Equity trading in the 21st century', *Marshall School of Business Working Paper No. FBE 09–10*.

Attard, B (2000), 'Making a market. The jobbers of the London Stock Exchange, 1800–1986', *Financial History Review*, No. 7, pages 5–24.

Brunnermeier, M and Pedersen, L (2009), 'Market liquidity and funding liquidity', *Review of Financial Studies*, Vol. 22, pages 2,201–38.

Cespa, G and Foucault, T (2012), 'Illiquidity contagion and liquidity crashes', available at www.tinbergen.nl/~sofie2012/papers/CespaFoucault2012.pdf.

CFTC-SEC (2010), 'Findings regarding the market events of 6 May 2010, report of the staffs of the CFTC and SEC to the Joint Advisory Committee on Emerging Regulatory Issues', available at www.sec.gov/news/studies/2010/marketevents-report.pdf.

Charitou, A and Panayides, M (2009), 'Market making in international capital markets', *International Journal of Managerial Finance*, Vol. 5, pages 50–80.

Demsetz, H (1968), 'The cost of transacting', *Quarterly Journal of Economics*, Vol. 82, pages 33–53.

Dodd, R (2002), 'The economic rationale for financial market regulation', *Special Policy Report 12*, Financial Policy Forum, Derivatives Study Center, available at www.financialpolicy.org/fpfspr12.pdf.

Fleming, M (2000), 'The benchmark U.S. Treasury market: recent performance and possible alternatives', *Federal Reserve Bank of New York Economic Policy Review*, Vol. 6, No. 1, pages 129–45.

Hendershott, T and Moulton, P (2010), 'Automation, speed and stock market quality: the NYSE's hybrid', *Journal of Financial Markets*, No. 14, pages 568–604.

Hengelbrock, J (2008), 'Designated sponsors and bid-ask spreads on Xetra', available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1046961.

Hwang, I, Kisling, W and Mehta, N (2012), 'Investors whipsawed by price swings in IBM, Coca-Cola', Bloomberg, 20 July, available at www.bloomberg.com/news/2012-07-20/hourly-price-swings-whipsaw-investors-in-ibm-coke-mcdonald-s.html.

Khandani, A and Lo, A (2011), 'What happened to the quants in August 2007? Evidence from factors and transactions data', *Journal of Financial Markets*, Vol. 14, pages 1–46.

Menkveld, A and Wang, T (2009), 'How do designated market makers create value for small-caps?', available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=890526.

Meyer, G (2011), 'High-speed commodities traders under scrutiny', *Financial Times*, 9 March, available at www.ft.com/cms/s/0/dbfb15d6-4a83-11e0-82ab-00144feab49a.html#axzz1Ifuk6rCi.

Nanex (2010), 'Analysis of the 'flash crash'', available at www.nanex.net/20100506/FlashCrashAnalysis_Intro.html.

Neal, L and Davis, L (2006), 'The evolution of the structure and performance of the London Stock Exchange in the first global financial market, 1812–1914', *European Review of Economic History*, Vol. 10, pages 279–300.

Panayides, M A (2007), 'Affirmative obligations and market making with inventory', *Journal of Financial Economics*, Vol. 86, pages 513–42.

Skjeltorp, J A and Ødegaard, B (2010), 'Why do firms pay for liquidity provision in limit order markets?', available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1944057.

Venkataraman, K and Waisburd, A (2007), 'The value of the designated market maker', *Journal of Financial and Quantitative Analysis*, Vol. 42, pages 735–58.

Zigrand, J, Cliff, D and Hendershott, T (2012), 'Financial stability and computer based trading', Paper 1 in *The future of computer trading in financial markets*, Foresight, Government Office for Science, pages 6–23, available at www.bis.gov.uk/assets/foresight/docs/computer-trading/11-1276-the-future-of-computer-trading-in-financial-markets.

The Prudential Regulation Authority

By Andrew Bailey, Executive Director of the Bank of England and Managing Director of the Financial Services Authority's Prudential Business Unit, and Sarah Breeden and Gregory Stevens of the Bank's PRA Transition Unit.[1]

The Prudential Regulation Authority (PRA), as part of the Bank of England, will become the United Kingdom's prudential regulator for banks, building societies and credit unions (collectively deposit-takers), insurers and major investment firms in 2013. This is part of a wider reform of the UK regulatory framework, which will also see the creation of a Financial Policy Committee within the Bank, and a new conduct regulator, the Financial Conduct Authority. This article provides a brief description of the PRA's role and its intended supervisory approach. It summarises some of the key themes of the two more detailed documents about the PRA's intended approach that were published jointly by the Bank and the Financial Services Authority in October 2012.[2]

Introduction

A new regulatory framework for the United Kingdom's financial sector is expected to come into effect in April 2013. This new framework results from reforms proposed in the Chancellor of the Exchequer's Mansion House speech in 2010.[3]

Under the new framework (illustrated in **Figure 1**), the Financial Services Authority (FSA), which is currently responsible for regulation of financial firms from both a 'prudential' and 'conduct' perspective, will cease to exist in its current form. Most aspects of its role will be performed by two new authorities:

- The **Prudential Regulation Authority** (PRA) will, as a subsidiary company, be a part of the Bank of England and responsible for the prudential regulation of banks, building societies and credit unions (collectively 'deposit-takers'), insurers and major investment firms.[4] As prudential regulator, the PRA will promote the safety and soundness of these firms, seeking to minimise the adverse effects that they can have on the stability of the UK financial system; and contribute to ensuring that insurance policyholders are appropriately protected. The PRA's role is described in more detail in this article.

- The **Financial Conduct Authority** (FCA) will be responsible for ensuring that relevant markets function well, and for the conduct regulation of all financial services firms. It will also be responsible for the prudential regulation of those financial services firms not supervised by the PRA, for example asset managers. The FCA will be a separate institution.

The Bank of England will have a responsibility for financial stability, based on an amended statutory objective to protect and enhance the stability of the financial system of the United Kingdom. And, in support of this objective, the **Financial Policy Committee** (FPC) will be established within the Bank, charged with identifying, monitoring and taking action to remove or reduce systemic risks. The FPC, which already exists in interim form, will be able to make recommendations and give directions to the PRA and the FCA on specific actions that should be taken in order to achieve the FPC's objectives.[5]

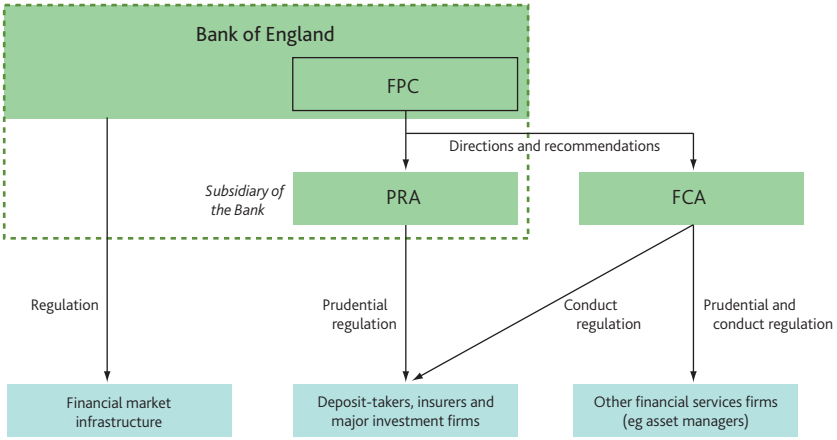
The Bank will also assume responsibility for supervision of central counterparties and securities settlement systems, and will play an increased role in co-ordinating financial sector resilience.

Interaction between the PRA and other authorities

The PRA's objective to promote safety and soundness and the Bank's financial stability objective are complementary. And having the PRA as part of the Bank, with close links to the FPC, will allow the authorities to combine ***firm-specific*** supervision

(1) The authors would like to thank George Speight, as well as Alan Adkins, Marie Bogdan, Deborah Chesworth, Heeral Chhatralia, Robert Dedman, Martin Etheridge, James Farquharson, Nigel Fray, Alex Holmes, Mounir Kenaissi, Gordon McDowall, Diane Moore, Rob Price, Stephen Senior, Anna Sweeney, Ian Tower and Peter Vipond, for their contribution to the two documents on which this article is based.
(2) See www.bankofengland.co.uk/publications/Documents/other/pra/bankingappr1210.pdf and www.bankofengland.co.uk/publications/Documents/other/pra/insuranceappr1210.pdf.
(3) See www.hm-treasury.gov.uk/press_12_10.htm. For more details of the proposals, see www.hm-treasury.gov.uk/d/consult_newfinancial_regulation170211.pdf (note that some details have changed since publication in February 2011; for an up-to-date account, see the Financial Services Bill at http://services.parliament.uk/bills/2012-13/financialservices.html).
(4) The PRA will not regulate all investment firms, only a small number that could present significant risks to the stability of the financial system.
(5) See www.hm-treasury.gov.uk/d/condoc_fpc_tools_180912.pdf.

Figure 1 Simplified picture of the new regulatory framework



Note: In this diagram, 'Financial market infrastructure' refers to central counterparties, securities settlement systems and recognised payment systems.

with work to protect and enhance the resilience of the financial ***system as a whole***. The Chief Executive Officer of the PRA will be a member of the FPC, and will also be a Deputy Governor of the Bank. The PRA will co-operate closely with the rest of the Bank on, for example, oversight of financial market infrastructure. It will also work with the Bank's Special Resolution Unit (SRU) — which plans for and implements resolutions of failing UK banks and building societies — on resolution and operational resilience.

The PRA will also co-operate closely with the FCA. The key principle underlying this co-operation will be that each authority should focus on the key risks to its own objectives, while being aware of the potential for concerns of the other. Separate mandates of the PRA and FCA for prudential and for conduct regulation will allow both regulators to apply more focus to their respective areas than has previously been the case.

The international environment will also affect the operation of the new authorities. Reflecting the international nature of the banking and insurance industries, the PRA will play a full and active role with its counterparts globally and in the European Union. In particular, it will seek to assist in developing and implementing prudential standards, and in supervising firms with international operations.

This article discusses how the PRA will deliver on its statutory objectives. It is organised as follows. The first section describes the PRA's statutory objectives and its overall approach to advancing them. The second section sets out some of the key practices that the PRA will expect of firms in ensuring that they act in a safe and sound manner, consistent with the stability of the financial system and policyholder protection. The third section describes how the PRA will assess the risks that firms pose to its objectives.

The PRA's objectives

The PRA's role as prudential regulator will be grounded in its two statutory objectives:

- To promote the **safety and soundness** of all the firms it regulates. This involves firms having **resilience against failure** and — in the event they do fail, or simply in the course of business — **avoiding harm resulting from disruption to the continuity of provision of financial services**. In promoting safety and soundness, the PRA will be required to focus primarily on the harm that firms can cause to the **stability of the UK financial system**.

- Specifically for insurers, to contribute to the securing of an **appropriate degree of protection for those who are, or may become, policyholders**.

Both of these objectives are underpinned by the principle that a stable financial system, which is resilient in providing the critical financial services the economy needs, is a necessary condition for a healthy and successful economy.

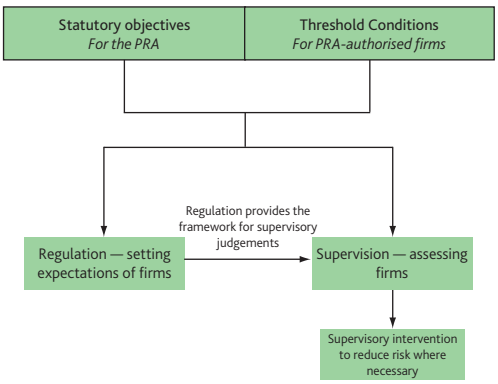
The statute is explicit that it is not the PRA's role to ensure that no firm fails. Indeed, a key principle underlying the PRA's approach will be that it will not seek to operate a 'zero-failure' regime. Rather, the PRA, working with the SRU, will seek to ensure that any firms that fail do so in a way that avoids significant disruption to the supply of critical financial services. This will depend on the efficacy of any statutory resolution regime in place, including any arrangements to compensate depositors and policyholders through the Financial Services Compensation Scheme. Assessing, and planning to contain, the impact of failure will be a core part of the PRA's work.

The statute also requires firms to meet, and continue to meet, certain statutory 'Threshold Conditions' to be permitted to

engage in activities regulated by the PRA. These Threshold Conditions require, for example, firms to maintain appropriate capital and liquidity, and to have suitable management. Though they will be distinct in law, the Threshold Conditions are closely related in substance to the objectives, since they will promote the safety and soundness of firms and policyholder protection. They will be crucial to the operation of the new regime.

The PRA will advance its objectives and promote adherence to the Threshold Conditions by two means. First, by setting out standards, or 'policies', including both detailed rules and higher-level expectations, that it will expect firms to meet — that is, **regulation**. And second, by assessing the risks that firms pose to the PRA's objectives in the context of these policies, taking action where necessary to reduce them — that is, **supervision**. This framework is illustrated in **Figure 2**.

Figure 2 Stylised diagram of the PRA's approach



The PRA's supervisory approach

The PRA's supervisory approach will have three defining characteristics:

- **A judgement-based approach.** The PRA will use judgement in determining whether firms are safe and sound, whether insurers protect policyholders appropriately, and thus whether firms meet, and are likely to continue to meet, the Threshold Conditions. Judgements will be based on evidence and analysis.

- **A forward-looking approach.** The PRA will assess firms not just against current risks, but also against those that could plausibly arise in the future. Understanding the external economic environment will be crucial in this regard. Where the PRA judges it necessary to intervene, it will generally aim to do so at an early stage.

- **A focused approach.** The PRA will focus on those issues and those firms that pose the greatest risk to the stability of the UK financial system and to policyholders. The frequency and intensity of supervision applied to a particular firm will therefore increase in line with the risk it poses to the PRA's objectives.

The PRA's regulatory decision-making will be rigorous and well documented, consistent with public law. Its most significant supervisory judgements will be taken by its Board — comprising the Governor of the Bank of England, the Deputy Governor for Financial Stability, the Chief Executive Officer of the PRA (and Deputy Governor for Prudential Regulation), and independent non-executive members.(1) The Board will be accountable to Parliament, in the same way as the Bank's other statutory decision-making bodies: the Monetary Policy Committee and the Financial Policy Committee.

How firms can pose risks to the PRA's objectives in practice

In promoting the safety and soundness of firms, the PRA must focus primarily on avoiding adverse effects on the stability of the UK financial system.

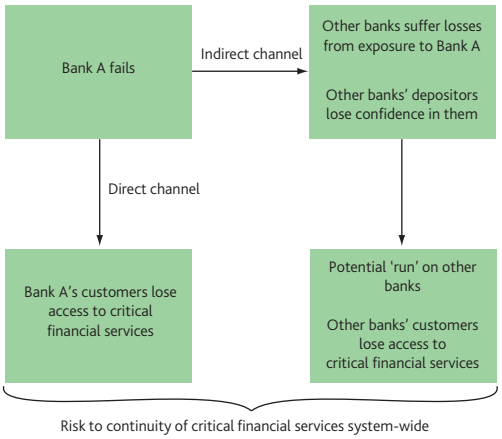
Firms can affect the stability of the system through the way in which they carry on their business. For example, a bank could compete for business too aggressively and thus contribute to risky behaviour across the system as a whole. And the investment strategy of general or life insurance companies might have consequences for the rest of the system if the scale of their assets allows their investment decisions to accentuate movements in asset prices.

Firms also have the potential to affect the stability of the financial system adversely by failing. These effects can be direct; for example, the failure of a bank could prevent its depositors from accessing their funds and hence from undertaking economic activity. They can also be indirect; for example, the failure of a bank could affect confidence in other banks and financial intermediaries more generally. Indirect effects are of particular concern for deposit-takers, given their role in providing 'maturity transformation' of deposits and other short-term liabilities on the one hand, into longer-term assets — typically loans — on the other. This maturity mismatch makes deposit-takers vulnerable to contagion following the failure of other firms. These direct and indirect channels are illustrated in **Figure 3**.

Traditional insurers do not generally threaten the stability of the financial system in the same way as deposit-takers. Nonetheless, their failure has the potential to affect the real economy adversely. For example, the sudden withdrawal of general insurance in areas such as compulsory motor insurance, trade finance, or marine or aviation cover has the

(1) Non-executive members who participate in decision-making — of which there will be at least as many as Bank executive members — will be individuals with a proven successful track record in public service, banking, insurance or other relevant financial services. They will be appointed by the Court of the Bank with the approval of HM Treasury. The CEO of the FCA will also be a non-executive member of the Board, but will not take part in regulatory decisions.

Figure 3 Channels through which the failure of a deposit-taker can affect financial stability



potential directly to affect the ability of individuals or companies to undertake real economic activity. This underlies the PRA's other objective, to contribute to securing an appropriate degree of protection for insurance policyholders. Specifically, the PRA will seek to ensure that there is a reasonably high probability that an insurer can meet claims from, and material obligations to, policyholders as they fall due; and to ensure that adverse consequences for policyholders of an insurer's failure are minimised.(1)

The box on page 358 describes why a prudential regulator is required in greater detail.

Regulation — setting expectations of firms

Advancing the PRA's objectives will ultimately rely on firms conducting their business in a safe and sound manner, consistent with the stability of the financial system and policyholder protection. The PRA will therefore **regulate** firms, setting out expectations it will have of them and which they must meet if the PRA's objectives are to be advanced. The PRA will expect firms to adhere to the spirit as well as to the letter of its expectations, and to maintain sight of the overall principles of safety and soundness and, in the case of insurance firms, policyholder protection.

In large part the PRA's expectations will reflect the statutory Threshold Conditions that firms will legally be required to meet. In broad terms, the Threshold Conditions will require firms: to have an appropriate amount and quality of capital and liquidity; to have appropriate resources to measure, monitor and manage risk; more generally to conduct their business prudently; to be 'fit and proper';(2) and to be capable of being supervised effectively by the PRA.

The PRA will communicate these, and further expectations relevant to its objectives, under the broad headings of management and governance, risk management and controls, capital, liquidity and resolvability. Robustness in all of these areas will be critical to reducing the risks that firms pose to the PRA's objectives. The PRA's main expectations in each of these areas, and the rationale for its interest, are described below.

Management and governance

It is the responsibility of each firm's board and management to manage their firm prudently, consistent with safety and soundness, the stability of the financial system and, in the case of insurance firms, policyholder protection. The PRA will therefore take a significant interest in the way that firms are run, and in ensuring that firms and their management are fit and proper.

The overall culture of a firm is a key determinant of its behaviour, and hence whether it acts in a manner consistent with the PRA's objectives. The board and senior management of a firm are responsible for setting and embedding that firm's culture. While there is no single 'right' culture, the board should ensure that the principles of safety and soundness and, where applicable, policyholder protection, are embedded throughout the whole organisation. This includes firms following the PRA's policies in line with their spirit and intended outcome — not managing their business only to the letter, or gaming the rules. It includes boards holding management to account. And it includes firms having in place sufficient controls to minimise incentives for excessive risk-taking, for example remuneration structures that reward careful and prudent management.

Firms need to be run by people who are competent to fill their roles. It is the responsibility of boards and senior management to ensure this. The PRA will also have the power under statute to require individuals with a significant influence on the affairs of a firm (for example, the Chair and the Chief Executive) to seek PRA approval before taking up their position. Such individuals will be expected to demonstrate competence, probity and integrity.

Firms need also to be structured in a way that enables management to run them prudently, and enables the regulator to supervise them effectively. This includes clear structures of accountability and delegation of responsibilities. And, crucially, it requires that the group structure within which a firm sits does not impede that firm's effective supervision.

Risk management and controls

The PRA will attach particular importance to firms managing risk effectively, because it is the crystallisation of risk, or

(1) Policyholders will also be protected by the FCA as conduct regulator. The FCA will seek to ensure that consumers are treated fairly in their dealings with insurers.
(2) This includes a firm complying in an appropriate manner with obligations imposed by the PRA, and having management that acts with probity and has adequate skills and experience.

Why do we need a prudential regulator?

It is likely that, in the absence of prudential regulation, deposit-takers, insurers and investment firms would be less resilient against failure, and risk more disruption to the continuity of financial services, than is in the public interest. This box explains the key factors driving this, and which prudential regulation aims to counter.

Banks, building societies and credit unions

Prudential regulation of banks, building societies and credit unions is necessary for a number of reasons.

First, because of the typically **liquid nature of its liabilities**, it is possible for a deposit-taker to be subject to a 'run' — whereby a large number of customers attempt to withdraw their deposits at the same time — even if the deposit-taker is solvent. This outcome unnecessarily destroys economic value. Deposit guarantees and central bank liquidity insurance can address this problem. But these backstops in turn reduce the incentives for firms to manage their business in a prudent manner (so-called 'moral hazard'), creating the potential for excessive risk-taking in the absence of prudential regulation.

A second motivation for prudential regulation relates to the potential for the failure of a deposit-taker to **harm the stability of the financial system more widely**. For example, a bank that fails could cause depositors to lose confidence in other banks with similar business models, triggering a run as described above. ***At an individual level***, firms have no incentive to take into account such system-wide effects, but ***collectively*** they share an interest in a stable financial system. They thus face a 'collective action' problem. And, crucially, the risk that the failure of a firm could cause wider disruption to the financial system underpins expectations of the state providing solvency support to them. This moral hazard again compounds incentives for excessive risk-taking and reduces market discipline. Prudential regulation aims to address these issues.(1)

Insurers

A variety of difficulties for policyholders in monitoring and influencing the behaviour of insurers motivate the involvement of a prudential regulator.

There is fundamental uncertainty associated with insurers' liabilities — over the total size and timing of future payments to policyholders. This can mean that it is difficult for policyholders to assess the financial strength of their insurer. Additionally, policyholders (especially those with long-term contracts) may have little scope to influence the behaviour of insurers once policies have been taken out. And while commercial or wholesale policyholders may be better equipped to monitor and exert some discipline on insurers, they are hampered by the opacity of the value of insurers' assets and liabilities. These factors help to explain why an insurer may have the opportunity to take more risk than is in the interests of policyholders and other creditors. Prudential regulation must address this.

Common factors

There are, in addition, some common factors that obstruct firms from being run in a sufficiently prudent manner. For example, the owners of a firm often cannot control the firm effectively, due to a lack of information and difficulties in co-ordinating themselves (since they are often a wide and diverse group of shareholders). This can allow the management of the firm to pursue its own objectives, which may be to prioritise short-term reward over long-term soundness. And even where owners have adequate control over their firm, it may still be in their interest (if they are private shareholders) to have the firm take excessive risk — more than is in the public interest — since their liability in the event of failure is limited, while their potential gains from successful risk-taking are not.

(1) See for example Acharya and Yorulmazer (2007) and Aikman, Haldane and Nelson (2010).

concerns about risks crystallising in the future, that causes problems for firms' safety and soundness. Appropriate risk management is a key aspect of overall prudent management and governance.

Firms need to understand the risks to which they are exposed and take appropriate steps to manage them. This is not to say that firms should be able to withstand all conceivable stresses — by considering the most extreme circumstances, it will always be possible to identify a stress scenario in which a firm fails. Rather, it is vital that the boards and senior management of firms reach a considered decision on the level of risk that they are willing to take, and have appropriate controls to ensure this 'risk appetite' is reflected in their business in practice. The level of risk that firms are willing to take should be consistent with the PRA's objectives.

A firm's 'control framework' encompasses the processes, delegated authorities and limits that put into effect its approach to risk management and financial and operational control. This framework needs to be comprehensive in its coverage of the whole firm and all classes of risk, commensurate with the nature, scale and complexity of the firm's business, and to deliver a properly controlled operating environment. In part in order to support this framework, firms must have available robust information allowing their senior management, with a reasonable amount of effort, to form a

clear view of the risks being run by the business. And firms should have internal functions (for example, internal audit, risk management and finance functions) that are able to support and challenge their risk management approach effectively, consistent with the nature, scale and complexity of their business.

Firms must also observe high standards in operational risk management, having procedures in place to ensure continuity in the critical services they provide.

Capital

Capital acts as a buffer to absorb unexpected losses. Having enough capital of sufficiently high quality therefore reduces the risk of a firm becoming unable to meet the claims of its creditors. Given its ability to absorb losses, capital is also crucial for maintaining the confidence of those creditors. This is particularly important for deposit-takers and investment firms given that their liabilities are usually of shorter maturity than their assets and that they are therefore vulnerable to 'runs' (see the box on page 358). The PRA will take a strong interest in ensuring that firms are adequately capitalised.

In terms of quality, a significant part of a firm's capital needs to be ordinary shares and reserves. These are the highest-quality form of capital, allowing firms to absorb losses without prompting the winding up or legal reorganisation of the firm and consequent disruption and loss of value. Lower-quality capital (for example, subordinated loan capital) can play a role if a firm has failed, but its value in terms of the PRA's objectives is less.

As in all areas, firms in the first instance need to take responsibility themselves for ensuring that they maintain adequate capital. They should stress test their capital requirements against a range of plausible yet severe scenarios. And firms should consider plausible recovery actions that they could take, designed to return them to a stable, sustainable position following firm-specific or market-wide stress.

While firms should take responsibility themselves for maintaining adequate capital, they are also typically obliged to meet certain regulatory standards regarding the quantity of capital they should maintain, not least because a firm may have incentives to run its business less prudently than is in the public interest (see the box on page 358). The PRA will therefore itself form a judgement on the minimum requirements that firms should meet, consistent with relevant European and other international regulatory standards for capital adequacy.

Supplementing their regulatory capital requirements, firms should also consider whether their degree of leverage is appropriate. And they should ensure that their business is appropriately diversified, for example by observing prudent limits on large exposures to individual counterparties.

Reflecting the importance of combining firm-specific supervision with oversight of the financial system as a whole, there will, in addition, be macroprudential elements of the capital regime. These will fall under the purview of the FPC.

Liquidity

Liquidity reflects a firm's ability to meet its liabilities (for example, individuals withdrawing funds from their current accounts, or policyholders making insurance claims) as they fall due. Liquidity is a vital aspect of a firm's soundness, so the PRA will attach great importance to firms taking a prudent approach to liquidity management.

Firms should observe a prudent 'maturity mismatch' profile. Maturity mismatch — where firms lend at longer maturities than they borrow — is at the heart of a deposit-taker's business. Insurers, in contrast, must ensure that the liabilities incurred in writing insurance policies are matched with assets of an appropriate nature and term. But a principle common across all firms is that they should be prudent in their approach. For example, banks should not rely excessively on short-term wholesale funding sources that may prove difficult to secure during times of stress. And insurers should ensure that their assets are of an appropriate maturity and liquidity to allow them to meet their expected profile of liabilities.

To ensure that they are able to meet their liabilities given the degree of maturity mismatch that they have adopted, deposit-takers and investment firms should maintain a buffer of high-quality unencumbered assets that can be reliably liquidated, even in stressed circumstances. This buffer should be of a sufficient size to allow firms to withstand a wide range of severe but plausible stresses. The PRA will expect and allow a firm's buffer to be used in stressed circumstances.

Similar to the case of capital, firms should take responsibility themselves for ensuring that they are sufficiently resilient to liquidity risk. But the PRA will also specify to most deposit-takers and investment firms what it regards as an appropriate size and quality for their liquid asset buffer, given the incentives that firms have to behave less prudently than is in the public interest.

Those deposit-takers eligible to do so should ensure that they have access to the Bank of England's liquidity insurance facilities, which can provide liquidity support in the event of actual or prospective stress.(1) Firms should, however, manage their liquidity needs in the market rather than turn to the Bank as a matter of routine; the Bank's liquidity insurance facilities are designed in such a way as to encourage this.

(1) Full eligibility criteria and a description of the Bank's operations in the sterling money markets are set out at www.bankofengland.co.uk/markets/Pages/sterlingoperations/redbook.aspx.

Insurers generally do not suffer from the same liquidity risks as banks. Nonetheless, insurers should maintain at all times sufficient liquid assets to enable them to meet their liabilities as they fall due, including under a range of severe but plausible stress scenarios. This applies also to insurance firms that engage in non-traditional, non-insurance activities (for example, entering into liquidity swaps or collateral upgrade transactions) which have the potential to pose greater liquidity risks.

Macroprudential liquidity considerations will fall under the purview of the FPC.

Resolvability

The PRA's objectives will require it to minimise adverse effects resulting from disruption to the continuity of financial services. But the statute is also clear that the PRA will not be expected to prevent all firm failures. It is therefore vital that firms are able to fail in an orderly way, without posing risks to the PRA's objectives: that is, that they are 'resolvable'. And allowing the possibility of firm failure reflects the view that they should be subject to the disciplines of the market. Assessing and planning to contain the impact of failure will be a core part of the PRA's work.

Firms will be expected to assist the PRA and, where appropriate, the SRU, in assessing their resolvability and, as required, drawing up plans for their resolution. This will include firms providing the information needed to assess the critical financial services that they provide and the potential consequences for financial stability or policyholders if they were to be disrupted. Where significant barriers or obstacles to resolvability are identified, firms will be expected to propose and implement changes to remove them.

Additionally, deposit-takers will be expected to produce a single, consistent view of each depositor's funds, to enable the Financial Services Compensation Scheme to implement rapid payout in the event of the firm's failure.

There is currently no special 'resolution regime' for investment firms or insurers that provides the authorities with additional tools for dealing with their failure.(1) HM Treasury plans to introduce a special resolution regime for investment firms. And, in August 2012, HM Treasury sought views on whether improvements are required to the current insolvency framework for insurers, and whether a comprehensive resolution regime with stabilisation powers is also required for systemically important insurers.

Making new policy

The PRA will set out its expectations in its published policy material. The PRA will aim to establish and maintain this material so that it is clear in intent and as concise as possible, and therefore usable by the senior management of firms. The PRA will perform careful analysis to determine whether and what revisions to its set of policies may be appropriate, whether negotiating policy internationally or acting autonomously. And it will solicit constructive comment on policy proposals, for example on the likely impact of proposed reforms and on different ways of achieving its intended policy outcome.

Supervision — assessing firms and mitigating risks

The previous section described the broad expectations the PRA will have of firms if they are to remain safe and sound and protect policyholders appropriately. This section examines how the PRA will **supervise** firms to ensure that they meet these expectations — including the Threshold Conditions — and, more broadly, to assess the risks that they are posing to the PRA's objectives. It will communicate its judgements to firms, and require them to take action, where appropriate, as a result.

Assessing risk

The PRA will aim to develop a rounded, robust and comprehensive view of a firm, in order to judge whether it is being run in a safe and sound manner, consistent with the stability of the financial system and policyholder protection. It will undertake a varied set of supervisory activities — conducting its assessment on a continuous cycle — to inform this view. The composition, frequency and intensity of these activities will vary reflecting the particular circumstances of a firm. This is described in more detail below.

The PRA's focus

The PRA will be required to promote the safety and soundness of all the firms it regulates. But it will be entitled to prioritise its resources towards those firms with the greatest potential to affect policyholders or the stability of the financial system adversely.(2) The scale of a firm's 'potential impact' will depend on its size, complexity and interconnectedness with the rest of the system. For insurers, it will also take account of the size (including number of policyholders) and type of business undertaken.

The PRA will also vary the resource it applies to firms based on their proximity to failure and resolvability, given the possible adverse effects of disorderly firm failure on its objectives. The

(1) A 'special administration regime' currently exists for investment firms. There are two broad ways in which insurers may exit the market. First, 'run-off': where a firm is closed to new business and the liabilities 'run off' over time. Insurers may use a scheme of arrangement approved by a court to agree a compromise with their creditors and to accelerate the process. And second, an insolvent insurer may enter a modified administration or liquidation procedure.

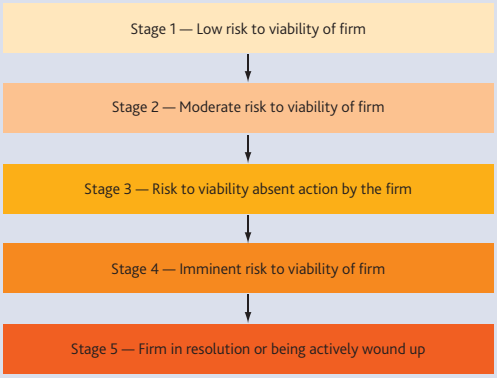
(2) Under this approach, firms that are unlikely to have a significant impact on the PRA's objectives on an individual basis, but which still have the potential to cause significant disruption collectively (for example, small credit unions), will be supervised on a portfolio basis and examined individually only occasionally, for example where a risk has crystallised. Large, complex firms, in contrast, will be subject to detailed supervision at an individual-firm level.

Proactive Intervention Framework

The PRA will take into account how close a firm is to failing when considering actions. Its judgement about a firm's proximity to failure will be captured in that firm's position within the Proactive Intervention Framework (PIF).(1)

The PIF is designed to ensure that the PRA puts into effect its aim to identify and respond to emerging risks at an early stage. There will be five clearly demarcated PIF stages, each denoting a different proximity to failure, and every firm will sit in a particular stage at each point in time (**Figure A**). As a firm moves to a higher PIF stage — that is, as the PRA judges that the firm's viability has deteriorated — the senior management of firms will be expected to ensure they take appropriate remedial action to reduce the likelihood of failure, and the authorities will ensure appropriate preparedness for resolution. For example, at Stage 3, a firm may be formally required to draw on the menu of options set out in its recovery plan (for example, to restore its capital position); at Stage 4 the authorities will confirm that all necessary actions to prepare for the firm's resolution have been taken.

Figure A Five stages of the PIF



(1) More information on the PIF is available in the PRA 'approach' documents at www.bankofengland.co.uk/publications/Pages/other/pra/pra.aspx.

PRA's 'Proactive Intervention Framework', which captures a firm's proximity to failure, is detailed in the box above. The PRA will also take into account the legal status of a firm (for example, whether it is a UK-authorised firm or a branch of a European Economic Area firm) in its approach.

Establishing the context for judgements

Any assessment of the risks facing firms requires an understanding of the external context in which they operate. The PRA's supervision will therefore include an assessment of how system-wide risks, for example from low interest rates, excess credit growth or international imbalances, are likely to affect firms. The PRA will draw on work by other parts of the Bank, including the views of the FPC on the macroprudential environment, in forming its view.

The PRA will also consider the particular risks that a firm faces and poses given its individual business model, in the context of that external economic environment. The PRA will examine both the threats to the viability of a firm's business model and the ways in which a firm could create adverse effects on other participants in the system by the way it carries on its business. This analysis will include an assessment of where and how a firm makes money, the risks it takes in so doing, and how it funds its activities. The analysis will take place at the level of the sector or the individual firm, as appropriate, with peer analysis providing an important means of identifying firms that pose different risks relative to their sector.

Supervisory activities making up the PRA's assessment

The PRA will not be formulaic about the supervisory activities it will perform, since its focus on the issues that pose the greatest risk to its objectives means that its work will depend on a firm's particular circumstances. Nonetheless, its supervisory work will comprise a selection of a set of possible activities which supervisors will deploy as they judge necessary.

The PRA will make use of data gathered in firms' regulatory returns, information in the public domain (for example, annual reports) and may also request other firm-specific data such as management information or forecasts.

As part of its information gathering and analysis, the PRA will require firms to participate in meetings with supervisors at a senior and working level. The PRA will also, as appropriate, conduct detailed on-site testing or inspections of a particular area. In-depth, focused reviews, for example of a firm's proprietary trading desks or its approach to valuations or risk weightings, will involve discussions with staff and reviews of internal documents. The PRA will involve its risk specialists and other technical staff in on-site work, stress testing and other assessments, as appropriate.

Firms' external auditors can and should play a role in supporting prudential supervision, given their ability to identify and flag to the PRA current and potential risks in a firm. Similarly, in the case of insurance firms, regular dialogue between actuaries and supervisors should form a key part of supervision. And the PRA may use firms' risk, compliance and internal audit functions to identify and measure risks, where it judges these to be effective.

Mitigating risk

The PRA will continually review its judgement of the risks that firms pose to its objectives on the basis of the supervisory

activities undertaken. It will communicate these judgements to firms and require them to take action as a result. The PRA will focus on outcomes when conveying supervisory messages to firms. As it is the responsibility of a firm to manage itself, the way in which firms achieve these outcomes will, in general, be up to them.

Consistent with its focus on key risks, the PRA will concentrate on material issues when engaging with firms. And there will be a clear and direct link between the risks that the PRA perceives to its objectives and the actions it will expect from firms in consequence. For example, if the PRA has identified deficiencies in a firm's forecasts of earnings, leading to risks to its financial health, the PRA will require the firm to take steps to tackle this, for instance via improvements to its forecasting, systems or governance.

Firms will sometimes disagree with the PRA's decisions. Furthermore, there will be occasions when events will show that the supervisor's judgement, in hindsight, was wrong. This is inevitable in a forward-looking regime. In order to minimise such outcomes, the PRA will need to be staffed by people with strong, relevant skills and experience. And its major judgements and decisions will involve the PRA's most senior and experienced staff and directors.

The PRA will, in general, discuss issues with firms in reaching its decisions, and will carefully consider representations made, not least to ensure that its decisions are made on the basis of all the relevant evidence. But firms should not approach their relationship with the PRA as a negotiation.

Use of legal powers

The PRA will have a variety of formal powers available to it under statute, which it will be able to use in the course of supervision if deemed necessary to reduce risks. For example, it may use its power to require information from firms, or commission a report by a third party into specific areas of interest. It may also vary a firm's permissions to undertake certain regulated activities, which may require a change to the firm's business model or future strategy.

While the PRA will look to firms to co-operate with it in resolving supervisory issues, it will not hesitate to use formal powers where it considers them to be an appropriate means of achieving its desired supervisory outcomes. This means that, in certain cases, the PRA will choose to deploy formal powers at an early stage and not merely as a last resort.

The PRA's preference will be to use its powers to address emerging risks. If successful, application of this approach should mean that enforcement actions are rare. The PRA will, however, have a set of disciplinary powers, including the power to impose financial penalties and publish public censures, for cases where such sanction is an appropriate response to the firm failing to meet the PRA's policies. The intention in deploying these powers might include sending a clear signal to a firm — and to the regulated community more widely — about the circumstances in which the PRA considers a firm's behaviour to be unacceptable, and so deterring future wrongdoing.

Conclusion

From next year, the PRA, as part of the Bank of England, will be the United Kingdom's prudential regulator for deposit-takers, insurers and major investment firms. It will be one part of a wider regulatory framework, working alongside the FPC, which will focus on risks to the stability of the financial system as a whole, and the FCA, which will be responsible for ensuring that relevant markets function well, conduct regulation of financial services firms and prudential regulation of financial services firms not regulated by the PRA.

The PRA will promote the safety and soundness of the firms it regulates, focusing on the adverse effects that they can have on the stability of the UK financial system; and contribute to ensuring that insurance policyholders are appropriately protected. It will make an important contribution to the Bank's core purpose of protecting and enhancing the stability of the UK financial system.

The PRA will advance its objectives by setting out expectations that firms should meet, and by assessing firms against these expectations, on a present and forward-looking basis, so as to judge the risks that they pose to its objectives. Where it considers a firm to pose an unacceptably high level of risk, the PRA will require the firm to take action to address this, intervening at an early stage, and using its legal powers if necessary.

The financial crisis has powerfully demonstrated the need for a new approach to financial regulation. The PRA's goal will be to focus on the things that matter most to achieving its statutory objectives and thus meeting its responsibility to the public.

References

Acharya, V and Yorulmazer, T (2007), 'Too many to fail — an analysis of time-inconsistency in bank closure policies', *Bank of England Working Paper No. 319*.

Aikman, D, Haldane, A G and Nelson, B (2010), 'Curbing the credit cycle', available at www.bankofengland.co.uk/publications/Documents/speeches/2010/speech463.pdf.

Reputation, risk-taking and macroprudential policy

Summary of Working Paper No. 462 David Aikman, Benjamin Nelson and Misa Tanaka

This paper considers the role of macroprudential countercyclical capital adequacy regulation in moderating credit cycles in a simple theoretical model. In our model, banks not only care about returns on their investments, but also their reputations. Imperfect information about banks' abilities and profitability means that they suffer a bigger reputational loss if they fail to make money when macroeconomic fundamentals are good than when they are bad. This is because when fundamentals are good, high-ability banks are more likely to earn high profits, such that markets attribute low profits to the low ability of bank managers. The fear of getting a bad market reputation gives low-ability bank managers the incentive to hide low profits and extend excessive credit in a bid to 'gamble for reputation' when fundamentals are good. This generates socially inefficient credit booms which ultimately lead to bank losses.

Our analysis suggests that countercyclical capital adequacy requirements are constrained socially optimal when macroeconomic fundamentals are within an intermediate range. By helping to reduce the incidence of inefficient credit booms, countercyclical capital adequacy requirements help to meet the dual objectives of moderating credit cycles and enhancing banking sector resilience. We are also able to separate two effects of countercyclical capital requirements on banks' risk-taking incentives, namely (i) the direct effect of raising the cost of risk-taking and (ii) the indirect effect of making information about the state of macroeconomic fundamentals public. We demonstrate that the latter can have a powerful effect in reducing banks' risk-taking incentives when fundamentals are rapidly deteriorating.

Our analysis focuses on a particular role for capital adequacy requirements, namely, that of preventing banks from investing in risky projects that have negative net present value. There are other rationales for countercyclical capital adequacy requirements which we have not considered here, including enhancing loss absorbance and avoiding socially costly financial crises. Our analysis also focuses on the role of capital adequacy requirements in preventing inefficient credit booms, and does not examine its potential role in preventing inefficient credit crunches. Examining all these aspects of countercyclical capital requirements in a single framework is left for future research.

The international transmission of volatility shocks: an empirical analysis

Summary of Working Paper No. 463 Haroon Mumtaz and Konstantinos Theodoridis

The recent financial crisis has been characterised by increasingly volatile macroeconomic data in the United States and the United Kingdom. In this paper we devise an empirical model to estimate the impact of this increase in volatility or uncertainty on the UK economy. In particular we examine the impact of an increase in uncertainty associated with US real activity. Uncertainty about growth in large economies has been a key consideration for policymakers in recent years.

The empirical model that we propose is an extension of vector autoregression (VAR) models. VAR models link each variable included in the model to past values of all the variables in the system. The residual associated with each variable is typically assumed to have a constant variance. For example if the model included US GDP growth, the variance of the residual to the relevant equation would be constant. This also implies that in this modelling set-up, the uncertainty associated with each variable (as proxied by the residual variance) is fixed over time. Given recent events, this may not be a good assumption.

Our paper extends this model along two dimensions. First, we allow the residual variance to change over time — in other words we allow for stochastic volatility. Second, we allow this stochastic volatility to enter as an explanatory variable in each equation of the model. We can therefore gauge the effect of volatility on each variable included in the VAR model.

In our empirical application, we include US GDP growth, US CPI inflation, the federal funds rate, UK GDP growth, UK CPI inflation and Bank Rate in the extended VAR model. We then try to estimate the impact of an increase in the stochastic volatility associated with the residual of the US GDP growth equation. We find that if this volatility increases by one standard deviation, UK GDP growth declines by 0.1% and UK CPI inflation increases by 0.1%. The impact of this shock on the US GDP growth and inflation is very similar. The impact is statistically important albeit small in economic terms.

We then employ a theoretical model of the open economy to understand the transmission channel of this shock. Model simulations indicate that it can be interpreted as a sudden change in the volatility associated with shocks to US wages or productivity — ie shocks to US 'supply'. A sudden increase in the volatilty of these shocks leads to an increase in precautionary savings by consumers who are more uncertain about the future. This leads to a reduction in consumption and subsequently GDP growth in both countries. Workers try to insure themselves against uncertainty about future wages by demanding higher pay in the current period and this puts upward pressure on inflation.

International policy spillovers at the zero lower bound

Summary of Working Paper No. 464 Alex Haberis and Anna Lipińska

In this paper, we are interested in how the policy of other central banks affects policy in a small open economy in the face of a large global demand shock that leads central banks internationally to cut rates to the zero lower bound (ZLB). Our interest in this issue comes from the policy response to the financial crisis that started in 2007/08. This hit many economies at the same time, leading to large declines in output during what has become known as the 'Great Recession'. In response, central banks around the world cut policy rates to (close to) zero to offset the deflationary pressure associated with the collapse in demand.

The ZLB creates an interesting set of challenges for monetary policy. This is because the conventional options available to policymakers to stimulate the economy — further rate cuts — are not available. Past academic work has shown that this can lead to trade-offs for policymakers in terms of stabilising inflation and output. In the current conjuncture, with the crisis having led many of the world's major central banks to cut policy rates to (or close to) the ZLB, the international dimension of these challenges is of particular interest — for instance, in terms of how policy overseas might create spillovers into the policy problem at home, which is the focus of this paper.

In practice, however, it is worth noting, that central banks greeted these challenges during the crisis with 'unconventional' quantitative policy action. In this paper, we do not look at unconventional monetary policy measures taken at the ZLB.

Instead, we adopt a more stylised framework for looking at monetary policy strategy, in line with previous research on monetary policy at the ZLB. We adopt this approach in part for its analytical convenience and in part because it allows us to couch our findings in terms of other work. In this framework, policy may be set either under 'discretion' or under 'commitment'. Discretionary policy involves the policymaker taking the action in a given period that gives the best outcome in terms of stabilising inflation and output in *that* period. When following policy under commitment, the policymaker commits to the course of action for all periods that achieves the best stabilisation performance over time.

This is more powerful, because, if it is possible, policy can operate more effectively on expectations about the future, which under discretion are constrained by the belief that policymakers will choose short-sighted policies (the famous 'time consistency' problem). In general, at the zero bound, commitment policy allows the policymaker to provide greater stimulus to the economy, which leads to improved stabilisation of inflation and output relative to a purely discretionary policy.

To analyse the issue, we use a model in which there are two countries: a large economy (which we refer to as 'foreign') and a small open economy (which we refer to as 'home'). The foreign economy is large in the sense it is not affected by developments in the home economy, although developments in the foreign economy can affect the home economy.

In our results, we find that in response to a large global demand shock, when foreign policy follows a commitment strategy, this reduces the home policymaker's ability to stabilise the home economy when home and foreign goods are close substitutes. This is because looser monetary policy in the foreign economy means the home real exchange rate is relatively appreciated compared to when the foreign policymaker sets policy under discretion. When there is a high degree of substitutability between goods, a stronger home real exchange rate induces large expenditure-switching effects away from home goods. This effect outweighs the impact on the demand for home goods from the higher level of foreign aggregate demand resulting from the looser stance of foreign monetary policy. Because our model is based on microeconomic foundations, we are able to work out how foreign policy affects social welfare at home. When goods are highly substitutable, home welfare is higher when foreign policy is set under discretion compared to commitment. In contrast, when goods are not close substitutes across countries, the opposite holds.

Size and complexity in model financial systems

Summary of Working Paper No. 465 Nimalan Arinaminpathy, Sujit Kapadia and Robert May

What role do large banks play in systemic risk and financial instability? How should capital adequacy standards recognise this role? How is stability shaped by concentration and diversification in the financial system? This paper explores these questions using a deliberately simplified, dynamical model of a banking system.

Developing methods used in epidemiology and ecology, we adopt network techniques which are well suited for such questions, particularly in modelling 'contagion' that is transmitted through linkages in the financial system. Specifically, we bring together three important transmission channels into a unified framework: (i) liquidity hoarding, where banks may cut their lending to each other as a defensive measure; (ii) asset price contagion linked to the falls in market prices which may be generated by asset sales by banks in distress; and (iii) the propagation of losses which may occur if banks default on their obligations to other banks in the interbank market (the network of lending exposures among banks). Importantly, we also integrate a mechanism for capturing how broader swings in 'confidence' in the system may contribute to instability, with the overall state of the system potentially influencing an individual bank's actions, and *vice versa*.

The interaction of such network and confidence effects arguably played a major role in the collapse of the interbank market and global liquidity 'freeze' that occurred during the financial crisis. Interbank loans have a range of maturities, from overnight to a matter of years, and may often be renewed, or 'rolled over', at the point of maturity. A pronounced feature of the 2007–08 crisis was that, as the system deteriorated, banks stopped lending to each other at all but the shortest maturities. The bankruptcy of Lehman Brothers in September 2008 transmitted distress further across the financial network. The effects extended well beyond those institutions directly exposed to Lehman Brothers, with banks throughout the system withdrawing interbank lending outright and propagating distress to the real economy by sharply contracting household and corporate lending.

Several specific motivating factors have been proposed to explain 'liquidity hoarding' (the maturity-shortening and ultimate withdrawal of interbank lending): precautionary measures by lending banks in anticipation of future liquidity shortfalls; counterparty concerns over specific borrowing banks; or collapses in overall system confidence. Our framework parsimoniously incorporates all of these mechanisms, while also capturing the idea that a bank's distress may affect not just those directly exposed or linked to it, but also confidence in the market at large.

We use our model to explore the effects of shocks to the system, such as the failure of banks or big losses on certain types of lending. We focus particularly on the adverse feedback dynamics arising from each of the contagion channels included, the effects of size disparity among banks and system concentration, and the effects of diversification. Our results highlight the disproportionate importance of large, well-connected banks for system stability: the impact of their collapse arises not only from their connectivity, but also from their effect on confidence in the system. Moreover, we show that while diversification may serve to limit the risk of failure of an individual bank, it does not mitigate the importance of that bank to systemic risk, and may indeed exacerbate it. Overall, these results illustrate the different approaches needed for regulation focused at the level of individual banks, and that focused on a systemic level. While sound microprudential regulation remains important for the former, the latter, macroprudential perspective, supports the notion of regulatory requirements concomitant with bank size, interconnectedness or (more generally) systemic importance. In particular, imposing tougher capital requirements on larger banks than smaller ones can enhance the resilience of the system. Furthermore, such requirements may also have the beneficial side-effect of providing disincentives for financial institutions to become 'too big to fail'. Our findings have conceptual analogies in ecosystem stability, and in the control of infectious diseases, which we also discuss briefly.

As with any theoretical approach, there are important caveats to our model. In particular, a key empirical challenge for future work is to quantify the confidence processes which we model. Incorporating uncertainty, for example over the underlying health of individual institutions or the system as whole, would also be a useful extension. Another key question is how the vulnerabilities in financial systems modelled in this paper emerge, and potentially grow, over time. Finally, while this paper focuses on one aspect of the regulatory response relating to capital requirements, other policy responses, such as the use of liquidity requirements or the implementation of effective resolution regimes, are also likely to be important in enhancing the resilience of the financial system.

QE and the gilt market: a disaggregated analysis

Summary of Working Paper No. 466 Martin Daines, Michael A S Joyce and Matthew Tong

In response to the deepening financial crisis in Autumn 2008, central banks in advanced economies reduced their policy rates sharply and introduced a range of other more or less unconventional measures designed to ease monetary conditions and to support financial stability.

In the United Kingdom, a key element of these unconventional monetary policy measures has been the programme of asset purchases financed by central bank money, commonly described as quantitative easing (QE). During the first round of QE purchases over the period from March 2009 to January 2010, the Bank of England (through an indemnified Asset Purchase Facility) bought £200 billion of domestic private and public assets, the vast majority of which were medium to long-term UK government bonds (gilts). By the end of January 2010, the Bank's gilt holdings represented nearly 30% of the stock of nominal gilts outside the official sector. Subsequently, between October 2011 and May 2011, the Bank completed a further £125 billion of purchases and, more recently, at its July 2012 meeting, the MPC voted to increase the size of its asset purchase programme by a further £50 billion to a total of £375 billion.

In this paper we analyse the impact on the gilt market of the first round of QE purchases during March 2009 to January 2010, in order to draw out lessons both about the effectiveness of the policy and also to shed light on the nature of the transmission mechanism from purchases onto bond prices/yields — a key link in the transmission of QE to the wider economy. In conditions where markets are functioning efficiently, one might expect economic news to be quickly assimilated into market prices as soon as it becomes available to market participants. But, given the unprecedented nature of the QE policy and market conditions at the beginning of 2009, it seems possible that the effects of QE may have taken longer than normal to get reflected in prices and indeed that the full market adjustment might have been delayed until the asset purchases were actually made. The contribution of this paper relative to earlier work on QE is to look at the effects of both the announcements (news) about QE and the actual purchases through the Bank's reverse auctions using disaggregated high-frequency data.

Our analysis of the high-frequency market reactions to individual announcements on QE suggests that the initial impact from the announcements took time to be fully priced in and that the cumulative initial impact on yields varied significantly across the term structure, with the largest impact up to 120 basis points between the 15 and 20-year maturity. We also find evidence that gilts with maturities close to or in the Bank's purchase range experienced larger relative yield falls (consistent with 'local supply effects') and that yields also fell more for gilts with longer maturities (consistent with 'duration risk effects').

Analysis of the Bank's reverse auctions suggests that ahead of each auction they led to further yield reductions on gilts both eligible and ineligible for purchase that averaged 2.5 basis points and 1.5 basis points respectively. These effects were not always reversed before close of business on the same day, with more persistent effects found to be positively associated with the degree of price dispersion of the accepted offers, an indicator of price uncertainty. These persistent effects may partly reflect learning by market participants. In addition, we find that the importance of the overall effects of the auctions on gilt yields diminished over time, as both liquidity and market functioning improved and knowledge of the operation of the Bank's purchase programme increased.

Econometric analysis of the time-series behaviour of gilt yields is consistent with the QE effect on gilt yields being quite persistent, once allowance is made for the countervailing effects on yields of fiscal news and improving macroeconomic prospects during 2009. Putting this finding together with our other results suggests that the peak gilt market response to the Bank's QE policy may not have occurred until the auction purchases began and the market learnt about the effects of the policy.

Overall our results suggest that the Bank's QE asset purchases had a significant and persistent impact on gilt yields. Our paper also provides direct evidence of local supply and duration risk effects consistent with imperfect substitution, which has implications beyond the financial crisis for how we think about price determination in the gilt market.

Factor adjustment costs: a structural investigation

Summary of Working Paper No. 467 Haroon Mumtaz and Francesco Zanetti

The costs associated with changes in capital and labour inputs are important factors affecting firms' decisions to expand or contract production. These ultimately affect the levels of economic activity and the patterns of business cycle activity that an economy experiences over long periods, and understanding the process is consequently important to macroeconomic policy makers. This paper investigates what theory and data tell us about the precise nature of adjustment costs, thus enabling us to build macroeconomic models better to describe business-cycle fluctuations.

We conduct the analysis by estimating a 'dynamic stochastic general equilibrium' model that accounts for several important features of the economy. Dynamic, because it emphasises how the economy evolves over time; stochastic, because in the model as in the world agents are continually buffeted by random shocks of various kind; and general equilibrium, because all parts of the economy are connected and affect each other. We examine several competing adjustment costs functions using US aggregate data. This approach has two main advantages. First, the model is derived by solving the optimal decision of each agent in the economy, thus enriching our theoretical understanding of how adjustment costs affect production. Second, rather than estimating adjustment costs functions using single equations, we pursue a multivariate approach by estimating the entire structural model, enabling more accurate estimates, aided by the fact that the independent variables are uncorrelated with the error terms (shocks) in the model.

We also find that the empirically acceptable adjustment costs function is non-linear, is increasing in both labour and capital, and also accounts for joint interactions between the two production inputs. Alternative specifications, with only capital or labour adjustment costs are not powerful.

We find that adjustment costs are small for both input factors. According to the theoretical framework, total adjustment costs represent 1.98% of total output per quarter. In addition, the cost of hiring an additional worker amounts to fourteen weeks of wages, whereas the cost of an extra unit of investment equals 0.21% of average output per unit of capital. Such estimates are within the range of values estimated using disaggregated data.

The analysis suggests that the reaction of factor adjustment costs to shocks is generally procyclical, except to shocks to the rate at which jobs and capital are dismissed. Finally, technology shocks are a major influence on fluctuations in factor adjustment costs in the short run, whereas shocks to the job dismissal rate compete with technology shocks to explain the bulk of fluctuations of factor adjustment costs in the long run.

Using Shapley's asymmetric power index to measure banks' contributions to systemic risk

Summary of Working Paper No. 468 Rodney J Garratt, Lewis Webber and Matthew Willison

Policymakers have in the period since the crisis been discussing how to regulate banks in ways that reflect the potentially different contributions banks make to systemic risk in the financial system in the event of their failure. One aspect of how an individual bank's failure could contribute to systemic risk could be defined in terms of whether its failure is considered to be pivotal in tipping the banking system from a state of stability to a state of instability. Based on this idea, we develop an approach that can be used to calculate the marginal contributions of individual bank failures to systemic risk.

The approach is based on a measure originally introduced by the mathematician and economist Lloyd Shapley. The so-called Shapley value is a way of allocating the output produced by a group among its members in a way that reflects fairly their individual contributions. In this paper we apply the Shapley value to the situation where the group is a set of banks that fail due to shocks to the values of their assets and the good they produce is in fact something bad — in this approach the bad is the failure of a set of banks tipping the system from a state of stability to one of instability.

The framework requires two key inputs: the values of banks' exposures to different asset classes; and the levels of banks' capital available to absorb losses on their asset holdings. The banking system can be hit by a range of shocks, which are defined in terms of the extent to which they reduce the value of the different asset classes. The shocks are assumed to occur with equal probability. For each possible shock, banks can be lined up in the order that they would fail as a result of that shock. Banks with asset portfolios weighted more towards the assets affected more by the shock, and/or have lower levels of capital, tend to be higher up the order of failure. The pivotal bank is the one that, when it is added to the banks that fail before it, causes the value of the failed banks' assets to move above a critical threshold value — this is defined as a systemic event. The pivotal bank receives a score of one (and other banks receive a score of zero). By taking an average of a bank's score over the range of possible shocks we calculate a measure of a bank's contribution to systemic risk. We illustrate, using simple examples, how banks' contributions depend on their asset portfolio compositions and their capital levels as well as on the calibration of the critical threshold that defines a systemic event.

We outline several ways in which the framework could be extended to consider: different definitions of a systemic event; adjustments to the values of banks' asset exposures to reflect the riskiness of those exposures; and the possibility of interbank contagion. We conclude by identifying some possible key next steps and further extensions of the approach. A key next step will be to apply the approach to bank data so that it could be used as a risk assessment tool. Since our approach applies to circumstances in which the system is in a state of instability, it would be natural to use our approach as part of a reverse stress-testing exercise.

High-frequency trading behaviour and its impact on market quality: evidence from the UK equity market

Summary of Working Paper No. 469 Evangelos Benos and Satchit Sagade

This paper studies the behaviour of high-frequency traders (HFTs) in the UK equity market and analyses its impact on aspects of market quality such as liquidity, price discovery and excess volatility. Although there is no precise definition of an 'HFT', the term is commonly used to describe firms that use computers to trade at high speeds and who also tend to end the day flat, ie carry small or no overnight positions.

HFT activity has increased steadily over the recent years in the US, the UK and continental European equity markets and, following a number of market mishaps (which seem to have been triggered by flawed computer trading algorithms), high-frequency trading has also caught the attention of regulators. However, the empirical evidence on the behaviour and impact of HFTs has so far been relatively limited and inconclusive. Thus, the Bank of England has a natural interest in better understanding HFT behaviour and how it might impact the quality of UK equity markets. In particular, a key question is whether and how HFT activity impacts price efficiency and liquidity.

This paper uses a sample from a data set of transaction reports, maintained by the Financial Services Authority, to attempt to give a first answer to these questions. The data identifies the counterparties to each transaction, which enables us to identify HFTs and study their behaviour.

We first find that HFTs exhibit substantial variability in their trading strategies. For instance, while some HFTs trade primarily passively (by posting orders that rest on the order book of the exchange so that others can trade against them), others trade primarily aggressively (by trading against resting orders of passive traders). In other words, some HFTs mostly supply liquidity and others mostly consume it. For this reason and in order to examine how trading behaviour is related to these patterns of liquidity provision, we split the HFTs in two groups, according to their trade aggressiveness, and examine the behaviour and impact of each group separately.

The 'passive' HFTs tend to alternate their positions over the short run (ie their buys tend to be followed by sells and their sells by buys) and their positions also tend to be insensitive to recent price changes. Conversely, 'aggressive' HFTs do not alternate their positions, and tend to trade in the direction of the recent price trend (ie they buy when the price rises and sell when it drops).

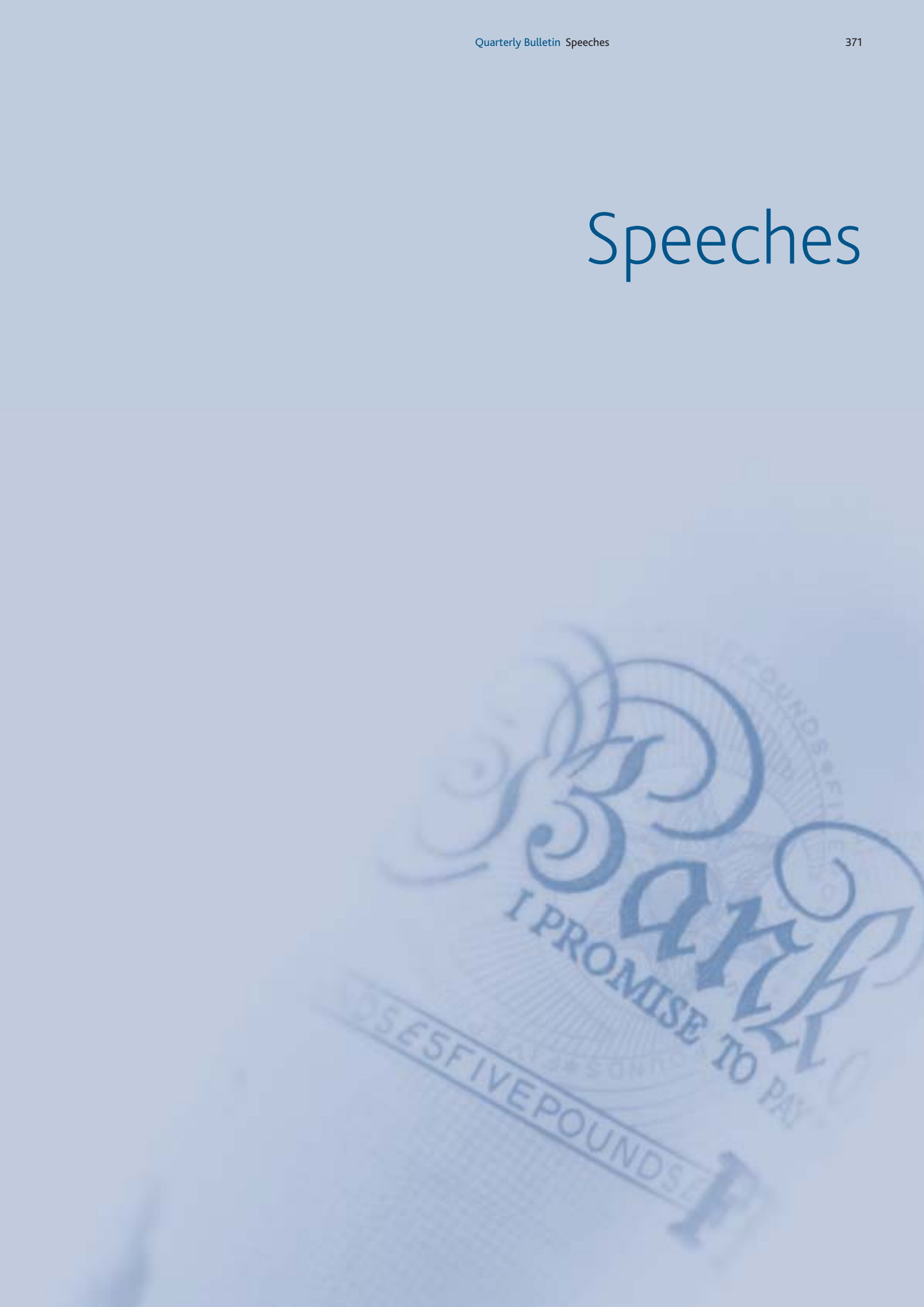
We next examine whether and how price volatility and the prevailing bid-ask spread influence HFT activity. We find that both 'passive' and 'aggressive' HFTs trade relatively more when prices are more volatile and when the spread is narrow. We suggest a number of reasons why this might be so.

Finally, we examine the impact of HFT activity on volatility. We note that volatility can be either 'good' (when price changes reflect the arrival of new information about fundamentals) or 'excessive' (when price changes do not reflect any information about fundamentals). In the latter case it is also referred to as 'noise'. Clearly, markets are more informationally efficient when there is more 'good' volatility and less 'noise'. We therefore examine the contribution of HFTs to both 'good' volatility and 'noise'. For that, we use an econometric framework that takes into account the exact time sequencing of HFT trades and price changes and, as such, allows us to isolate and estimate the causal effect of HFT activity on price volatility.

Our results show that there are instances where HFTs contribute (in absolute terms) a large amount of both 'good' and 'excessive' volatility; more so than the average, non-HFT, trader. This is possible if some of their trades carry a large amount of information while other trades are uninformative. We hypothesise that this may be because HFTs aim to end each day with relatively flat positions: if an HFT must, at some point during the day, only trade in order to adjust their inventory, these trades will have no information content and will likely create noise. For the stocks we analyse, HFTs are more informationally efficient than non-HFTs as their relative contribution of 'good' to 'excessive' volatility is on average 30% higher than that of non-HFTs. Owing however to the small number of stocks in our sample, we cannot confidently generalise these findings in the entire cross-section of stocks.

Given the instances of large contributions of both 'good' and 'excessive' volatility by HFTs, it is not immediately clear what the welfare implications of HFT activity are. If improvements in price efficiency at some times come part and parcel with additional noise at other times, then whether HFT activity is socially beneficial or not, will ultimately depend on how the marginal utility of information compares with the marginal disutility of noise, ie on how much additional noise we are willing to tolerate at some times for the benefit of more informed trading at other times. It will also depend on the balance between any beneficial impact HFTs may have on markets during 'normal' market conditions and the effect of HFT activity under more 'stressed' market conditions. Finally, the welfare implications of HFT activity will also depend on the propensity of errors in the operation of their algorithmic trading to cause harmful disturbances of the type experienced in the 'Flash Crash' of 6 May 2010. However, these issues are beyond the scope of this paper.

Speeches



Bank of England speeches

A short summary of speeches and *ad hoc* papers made by Bank personnel since publication of the previous *Bulletin* are listed below.

The labour market, productivity and inflation

Martin Weale, Monetary Policy Committee member, November 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech621.pdf

In a recent speech at the Manchester Economic Seminar, Martin Weale reviewed the characteristics of the labour market since the financial crisis in 2008. He suggested that a change in the working of the labour market had some implications for the growth of labour productivity. In particular, he found that changing occupation had typically resulted in a marked reduction in earnings since the onset of economic crisis, whereas before the crisis occupational moves had, on average, been associated with increases in earnings. This effect accounts for, at most, just under 10% of the total labour productivity shortfall. In his subsequent analysis, he concluded that there appears to have been little change in the relationship between unemployment and inflation since the crisis. He then emphasised that the factors underlying productivity were not sufficiently well understood to be confident that labour productivity would recover following a sharp increase in demand.

Broken glass — moving towards sustainable financial regulation

Michael Cohrs, Financial Policy Committee member, November 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech620.pdf

In this speech, Michael Cohrs surveyed the progress of regulators in reforming the financial system following the crisis, underlining the limitations of regulation, and highlighting key challenges.

Reflecting on his experience on the Financial Policy Committee, Michael noted that the Committee has found itself straying occasionally into the microprudential sphere, partly due to the concentrated nature of the British banking system. Nonetheless, he remained confident that macroprudential regulation would play an important role alongside microprudential regulation going forward both in the United Kingdom and elsewhere.

Turning to the issue of broader structural reform, Michael reflected on the considerable benefits that could arise if the Liikanen and Vickers proposals were enacted in full force, particularly in making the resolution of financial institutions much easier. But he remained concerned about the too big (or too important) to fail dilemma, calling for a greater urgency from policymakers to tackle this key problem. In particular, adding further pressure with a credible resolution regime and additional taxes for overly large financial institutions should be considered.

Michael also expressed a note of caution with regards to the current environment, explaining that pushing too hard on lending at a time when creditworthy companies and households are deleveraging may be counterproductive if increased lending to non-creditworthy borrowers were to lead to higher default rates.

The challenges in assessing capital requirements for banks

Andrew Bailey, Executive Director, November 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech619.pdf

In this speech at a Bank of America Merrill Lynch conference, Andrew Bailey continued his series of speeches on the appropriate approach to assessing the capital requirements for banks. Andrew argued that regulators needed to take into account a number of factors when making a judgement about the safety and soundness of firms.

Andrew reviewed the history of Basel I and II, and how these accords failed to adequately cover the risks the banks were taking. Andrew outlined how supervisors were now acting to reduce the excessive leverage and risk-taking that had grown in the past 20 years.

Andrew discussed the role of the leverage ratio. He said that he found it a useful back-up check rather than a 'frontline tool', in that, by itself, it did not prevent the main causes of the crisis. Andrew finished by setting out the considerations he believed should be taken into account when determining whether banks needed to hold additional capital.

Central banking in boom and slump

Charlie Bean, Deputy Governor, October 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech617.pdf

In the J S G Wilson Lecture at the University of Hull, Deputy Governor Charlie Bean examined how policy had been

set prior to the financial crisis and considered the lessons that have been learnt. He explained how monetary policy is not well suited to preventing credit/asset price booms and described the role of the new Financial Policy Committee in overseeing the stability of the financial system. In discussing the role of monetary policy in the aftermath of the financial crisis, he noted how the effect of lower yields on demand may be weaker when uncertainty is elevated and balance sheet repair is under way. But this did not mean that quantitative easing was impotent. He noted that a 'helicopter drop' of money may not be the obvious way to stimulate demand and that cancelling gilts held in the Asset Purchase Facility would weaken the link between policy and the economic environment.

A leaf being turned

Andrew Haldane, Executive Director for Financial Stability, October 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech616.pdf

Andrew Haldane spoke at an event organised by Occupy Economics to discuss how to create a more socially useful banking system. He argued that we are in the early stages of a reformation of finance, one that Occupy had played a significant role in helping to stir by highlighting the problems posed by rising inequality, pre and post-crisis.

Andrew argued that a financial reformation could be delivered with the help of five 'C's: a change in banking Culture; increases in bank Capital; deferred Compensation; moderating fluctuations in Credit; and promoting Competition in financial services. Over the past few months, there have already been encouraging signs of that change taking place and a new leaf being turned in the banking system.

Deconstruction

Ben Broadbent, Monetary Policy Committee member, October 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech618.pdf

In this speech, Ben Broadbent considered why the construction sector has experienced a bust without a preceding boom and explained why this may come to an end soon. One factor that he put forward is that, since credit conditions are in part formed internationally, the tightening of credit that has contributed to the bust of the UK construction sector has been greater than would have been caused by domestic factors alone. Another factor is that, for a long while before the crisis, the construction industry saw no growth in productivity. Its relative costs and prices therefore rose rapidly and, although nominal spending on construction grew fairly strongly, the sector's real output did not. But he argued that productivity growth in the construction sector may improve as the economy recovers. And as banks' funding conditions have fallen significantly this year, in part thanks to the Funding for Lending Scheme, easing credit conditions should have a positive effect on mortgage approvals and residential investment. He concluded that although the prospects for the construction sector look less unfavourable than they have done for a while, the inherent volatility of this sector coupled with general macro uncertainty makes it hard to be certain that this is the case.

On being the right size

Andrew Haldane, Executive Director for Financial Stability, October 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech615.pdf

In this Beesley Lecture, Andrew Haldane discussed the 'too big to fail' problem, both for individual banks and the financial system as a whole. He started by exploring the potential effects of recent financial deepening and concentration, which has generated escalating expectations of state support, thereby encouraging further expansion and concentration.

He then explored three policy approaches to tackling the 'too big to fail' problem. One of these is the imposition of systemic surcharges of additional capital. These have the effect of reducing expected system-wide losses in systemically important banks, but not materially so at current levels of the surcharge. Second, new resolution regimes are being put in place to allow banks to fail safely — although the market still has doubts about the credibility of these regimes for the biggest banks. Finally, structural reform of banks is taking place, through proposals by Volcker, Vickers and Liikanen.

Despite this policy progress, expectations of state support remain high. Andrew proposed potential additional reforms to tackle 'too big to fail', such as placing limits on bank size and market share and increasing competition. Research undertaken by Bank of England economists on economies of scale shows that the costs of these proposals might not be large. While existing initiatives are a step in the right direction, there may be some distance to travel before banking is the right size.

The role of deposit insurance in building a safer financial system

Paul Tucker, Deputy Governor, October 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech614.pdf

Paul Tucker provided an update on the Financial Stability Board's (FSB's) progress on resolving distressed financial institutions, including the role of deposit insurance. The key objectives were to ensure public money was never used to provide solvency support for a failing bank, but that stability was preserved. That required the introduction of legislation — in Europe, the Recovery and Resolution Directive — to incorporate the FSB's 'Key attributes on resolution', an international standard endorsed by G20 Leaders. Some financial groups would probably need to adapt their structure to remove impediments to resolution. The United Kingdom's plans to ring-fence UK retail deposit-taking were helpful here. Two broad resolution strategies could be identified. 'Single point of entry', where the home country executed a group-wide resolution from the top down. And 'multiple point of entry', where regional entities were resolved individually but in a co-ordinated way. There was a special challenge when a group had not issued enough bonded debt to absorb losses left after the extinction of equity. For groups funded to a very large extent by insured deposits, an alternative would be to 'bail in' the deposit insurers. This could mean that the insurer incurred lower losses than under liquidation and, as usual, any losses would be recouped by a levy on surviving insured banks.

Speech by the Governor to the South Wales Chamber of Commerce

Sir Mervyn King, Governor, October 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech613.pdf

The Governor began by noting the sheer scale of the adjustment that advanced economies faced, following a period of growing trade deficits and debt levels, and a collapse of their banking systems. The level of UK output remained some 15% below where steady growth since 2007 would have taken it.

Monetary policy had played its part in combating the downturn. There was no doubt that the economy would have followed an even more painful path in the absence of the Monetary Policy Committee's (MPC's) easing of monetary policy. But there were limits to the ability of monetary policy to continue to stimulate private sector spending. Policy could only smooth, not prevent, the ultimate adjustment in the pattern of demand and output needed for a rebalancing of the UK economy. Lower asset values had left debt levels looking too high and households, businesses and, especially, banks were all deleveraging.

Explaining the Bank's role in money creation, the Governor distinguished between 'good' money creation, where an independent central bank creates enough money in the economy to achieve price stability, and 'bad' money creation, where the government chooses the amount of money that is created in order to finance its expenditure. There had been some recent talk of the possibility that money created by the Bank could be used directly to finance government spending. The Governor argued that policies that combined monetary and fiscal elements were unnecessary, and dangerous.

Turning to the outlook for the UK economy, the recovery and rebalancing were proceeding at a slow and uncertain pace. There had been some positive signs, but it was difficult to know if they would persist. The MPC stood ready to inject more money into the economy if those positive signs faded.

The Bank and the banks

Andrew Haldane, Executive Director for Financial Stability, October 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech612.pdf

In this speech, Andrew Haldane looked at the lessons the Bank has learnt through its 318-year relationship with the banking system, which has culminated in the wholly new framework for financial stability policy being put in place today.

From its beginnings in 1694, Andrew discussed various financial crisis episodes in the Bank's history that have shaped its financial stability role today. The Overend and Gurney crisis of 1866 made clear the Bank's role as last resort lender and guardian of the financial system as a whole. The Bank's cold storage plan in 1914 averted a full-blown credit crisis and expanded the Bank's role beyond liquidity to the maintenance of adequate credit to the wider economy. And the failure of Barings in 1995 brought the Bank to the frontline of crisis management.

Andrew pointed out that the 2008 crisis has produced equally radical reforms, highlighting in particular the introduction of the Financial Policy Committee to conduct macroprudential policy — the missing link in crisis prevention. He noted that, as the Bank embarks on the latest chapter in its 318-year history, it will have learnt from and will build on the lessons of history.

Competition, the pressure for returns, and stability

Paul Tucker, Deputy Governor, October 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech611.pdf

Paul Tucker reviewed the fault lines in the financial system exposed by the crisis and the elements of the reform

programme most relevant to the banking industry. Moral hazard was not a complete explanation of the excessive risk-taking that occurred. Persistently accommodative global monetary conditions, agency problems, myopia and complexity all played a role. He highlighted six aspects to reform. First, holders of bank debt needed to be exposed to losses. Second, there was a need to revisit codes on remuneration, including whether management should be paid in some form of subordinated debt. Third, measures to address industry structure. That included the United Kingdom's ring-fencing plans, which would make the retail banking parts of the United Kingdom's largest institutions easier to resolve. Fourth, a step-up in prudential regulation, with higher risk-based capital requirements and a new backstop cap on leverage. Fifth, a reformed approach to supervision. And finally, the introduction of macroprudential policy to keep the regime up to date and to lean against exuberance.

The future of banking regulation in the United Kingdom

Andrew Bailey, Executive Director, October 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech610.pdf

In a speech at the British Bankers' Association Annual International Banking Conference, Andrew Bailey spoke about the role of bank regulation in macroeconomic policy.

Andrew spoke about the two hierarchical objectives of the Financial Policy Committee (FPC). The primary objective would involve identifying, and then taking actions to remove systemic risks with a view to protecting and enhancing the resilience of the financial system. The secondary objective was that, subject to being content on the first objective, the FPC should support the economic policy of the government, including its objectives for growth and employment.

The majority of Andrew's speech focused on the issue of capital. Andrew discussed the question of how much capital banks should grow in short order; why we want this to happen; and what form the capital should take. Alongside this, it was important to keep in mind the second FPC objective. If banks were to reach a higher level of capital in short order, this could lead to them shrinking their loan books at a time when they were being encouraged to lend more.

Andrew finished by explaining the actions that the Financial Services Authority and the FPC had taken to date in order to balance the objectives of the FPC.

'Investors: speak now or forever hold your peace'

Robert Jenkins, Financial Policy Committee member, October 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech607.pdf

In this speech, Robert Jenkins addressed the CFA UK Society — a collection of professionals operating in the investment management industry. Robert encouraged investors to become more actively involved in the ongoing debate about banking reform that was being played out between the banking lobby and the authorities. He suggested that investment managers had the combination of financial expertise and credibility sufficient to counterbalance the banks, and so better shape the outcome of the debate, particularly on the issue of leverage and the level of bank equity capital.

Twenty years of inflation targeting

Sir Mervyn King, Governor, October 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech606.pdf

The Governor's Stamp Memorial Lecture marked the 20th anniversary of the introduction of inflation targeting. Targeting price stability had led to a sustained period of low and stable inflation. But the recent financial crisis had raised the question: 'should monetary policy go beyond targeting price stability and also target financial stability?'.

The Governor set out three arguments for why meeting an inflation target in the short run might increase the risk of financial instability in the longer term. First, misperceptions on the part of households, firms and banks could stimulate unsustainable levels of spending and debt. Second, price stability could lead to complacency about future risks. Third, monetary policy itself could affect financial sector risk-taking.

The Governor argued that monetary policy could not fully offset the effects of financial crises after they have happened. This suggested that a strategy of higher interest rates prior to the crisis might have brought some benefits for financial stability. But those benefits would have been limited because the crisis was global in nature. Moreover, the effectiveness of persistently higher interest rates would have depended on what happened to the exchange rate, and such a strategy would have been a 'big gamble'.

The Governor argued that it would have been better to alleviate the risk of a crisis with macroprudential tools, such as a leverage ratio, rather than interest rates. But it would be optimistic to rely solely on such tools to prevent all future crises. In view of that, the Governor argued that there may be

circumstances in which it was justified to aim off the inflation target temporarily so as to moderate the risk of financial crises. Nevertheless, the case for price stability remained as strong as it was 20 years ago. Low and stable inflation was a pre-requisite for economic success.

Prudential regulation: challenges for the future

Andrew Bailey, Executive Director, October 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech604.pdf

In this speech at the University of Edinburgh Business School, Andrew Bailey spoke about the changes being made to the regulatory system in the United Kingdom and the benefits of having separate prudential and conduct regulators.

Andrew spoke about the objectives that the Prudential Regulation Authority will have: promoting the safety and soundness of firms, focusing on the potential harm that firms can cause for the stability of the United Kingdom's financial system; and additionally for insurance companies, policyholder protection.

Andrew argued that it was not the role of regulators to ensure that firms did not fail, but that they should ensure their failure would not cause significant disruption to the supply of critical financial services.

Finally, Andrew discussed the recommendations of the FPC relating to liquidity and capital, and the actions that the Financial Services Authority had taken to support the Funding for Lending Scheme.

We should go further unbundling banks

Andrew Haldane, Executive Director for Financial Stability, October 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech605.pdf

In this article, published in the *Financial Times*, Andrew Haldane discussed the reasons why global banks are currently valued at a discount of their equity book value, and what action can be taken to change this.

He noted that lowly bank valuations are in part a legacy of the past and in part a prophecy about the future. The legacy is the overhang of overvalued bank assets, caused by forbearance on past loans and inadequate provisioning for future loan losses. Looking ahead, investors appear to be uncertain over the future franchise value of banks. He argued that the problem appears to be not so much 'too big to fail' as 'too complex to price'.

Andrew said that there is a strong case for regulators to step in to lessen the uncertainties over valuations. He pointed to the Financial Policy Committee recent recommendation that UK banks make prudent valuations of the assets across their balance sheets.

He noted that structural solutions, such as the Vickers proposals in the United Kingdom, ought to help solve the 'too complex to price' problem. Alongside efforts to strengthen macro and microprudential regulation, these initiatives would help mobilise bank funding and lending, just when it is most needed for the economy.

A debate framed by fallacies

Robert Jenkins, Financial Policy Committee member, September 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech603.pdf

In this speech, Robert debunked three prominent myths that have hindered the post-crisis debate on regulation. First, Robert argued that there is no trade-off between safety and growth: by replacing debt with equity on their balance sheets, banks can both reduce leverage and support lending.

Second, additional equity is not expensive. While more equity may lower return on equity (RoE), Robert argued that RoE is a poor proxy of shareholder value, as it did not adjust for risk. On a risk-adjusted basis, investors appeared to prefer lower-leveraged firms.

Third, Robert suggested that governments need not choose between financial stability and the competitiveness of their domestic financial centres. Stronger, safer banks are more likely to grow market share at the expense of weaker competitors.

Robert suggested that these three myths had been propagated by bankers who did not understand the concepts of cost of capital or risk-adjusted returns, and were fixated by RoE. These myths had led to suboptimal reform and complicated international co-ordination, which need not be the case if governments and regulators realised they did not need to operate on the basis of such false choices.

Developments in financial markets, monetary and macroprudential policy

Paul Fisher, Executive Director for Markets, September 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech602.pdf

In this speech, Paul Fisher described how financial markets over the past year had been buffeted by the eurozone crisis, a global

slowdown, numerous policy actions and financial sector misconduct issues. But (implied) volatility and skews had fallen to post-crisis lows. This could reflect an assumption that central banks will deal with tail risks. An alternative explanation is that market participants have to some extent adapted to the new environment and decided that the show — albeit a chaste and less spectacular show — must go on. He described the phenomenon as not the old, indiscriminate 'search for yield', but rather a much more calculated hunt.

Paul contended that safe and sound credit institutions are a necessary part of generating sustainable economic growth. Risk-taking needs to be properly appraised, priced, managed and provisioned — not eliminated.

Turning to the Funding for Lending Scheme (FLS), Paul emphasised that it was designed to support the UK economy, not the banks. It creates strong incentives for banks to boost lending. If a bank's lending contracts, the price of liquidity in the Scheme will be higher. He stressed that we cannot expect every bank to increase its lending stock over the drawdown period — the crucial impact will be whether the FLS enables them to lend more than they would have done otherwise. Announcements of reductions in interest rates and the loosening of terms and conditions are indicative of an early impact.

Paul noted that the FLS does not seek to allocate credit to particular parts of the economy directly. Paul expected some banks' borrowing in the Scheme to exceed their lending growth, partly because the Scheme is set up so that the funding can be drawn down in advance. That was just one of the features designed to ensure that the Scheme gave the best possible support to the supply of credit.

A practical process for implementing a bail-in resolution power

Andrew Gracie, Director, Special Resolution Unit, September 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech600.pdf

In this speech, Mr Gracie outlined the operational steps that would be required in order to enact a bail-in within resolution in the context of the FSB's 'Key attributes of effective resolution regimes', and the European Commission's proposed Recovery and Resolution Directive. These steps include: first, an initial stabilisation period; second, a valuation process in order to determine the extent of losses for the purpose of establishing the amount which creditor claims need to be written down; third, a recapitalisation of the firm's operations via the conversion of further creditor claims into equity; and finally, a restructuring process in order to address the causes of the firm's failure in which long-term viability of certain operations is restored and others are wound down in an orderly way.

Why Britain's banking rules aren't restricting our economic recovery

Paul Fisher, Executive Director for Markets, September 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech601.pdf

In this article, Paul Fisher argued that the FPC's aims of ensuring a strong and resilient banking sector on the one hand, and supporting lending and economic growth on the other, are not conflicting.

Paul noted that the FPC is not trying to prevent banks from taking risks — every loan carries some credit risk. But it is crucial that the risks taken are known, proportionate and properly managed. The FPC can promote this using macroprudential policy. In 2011, the FPC encouraged banks to improve their resilience without exacerbating market fragility or reducing lending to the real economy. And in June 2012 the FPC recommended banks to make prudent valuations of their euro-area exposures, and to assess, manage and mitigate specific risks to their balance sheets.

By taking appropriate risks prudently, the FPC's primary and secondary objectives are both met. The resilience of the banking system to unexpected shocks is higher if banks manage their known risks properly. And by reducing uncertainty about the amount of risk on their balance sheets, banks will be more attractive to creditors and investors, ensuring a steady flow of funding and, in turn, lending.

The FPC has also asked UK banks to raise capital. This is entirely consistent with the FPC's objectives. A strongly capitalised banking system will be better placed to absorb shocks in the future and maintain lending to the real economy. Capital is used to support lending — it is not an asset on their balance sheets. Instead of worrying about the perceived costs of regulation, there should be more focus on the benefits of a safer banking system that takes measured risks through well-judged lending.

Productivity and the allocation of resources

Ben Broadbent, Monetary Policy Committee member, September 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech599.pdf

In a speech at Durham Business School, Ben Broadbent considered the reasons for the apparent slowdown in productivity growth in the United Kingdom. He argued that it may be due to a combination of uneven demand shocks across sectors and the subsequent failure of the financial sector to reallocate resources to sectors where they are most productive. The uneven demand could have resulted from a

number of sources, including the rise in commodity prices and the impact of the credit crunch on the demand for purely domestic-facing sectors. He then considered the implications of this for monetary policy making. First, he argued that policy should be set not just on its ability to affect demand but its capacity to improve the flow of finance in the economy as well. Second, he thought that policymakers should pay less attention than they normally do to movements in output and relatively more to changes in employment, noting that the relationship between employment and inflation has proved more stable through the crisis than those between either of those variables and output.

Winding and unwinding extraordinary monetary policy

David Miles, Monetary Policy Committee member, September 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech598.pdf

Professor Miles started by describing the exceptional monetary policy measures instigated since the start of the financial crisis. He argued that the Bank's asset purchase programme (QE) had been effective. The effectiveness of QE had to be judged against what might have happened in its absence. For example, instead of remaining broadly stagnant, GDP might have fallen significantly. Professor Miles also considered whether other, more radical, policies needed to be pursued. Money-financed government spending would not be attractive if it disregarded longer-term inflationary consequences. And if it were designed in a way that was sensitive to the longer-term consequences for inflation then it would closely resemble conventional QE.

Professor Miles then considered the post-crisis monetary policy framework, arguing that the Bank should retain key elements of the pre-crisis framework: the remuneration of reserves and the inflation target. He concluded that it might be advantageous for the Bank to start transitioning back to a more normal stance of monetary policy by raising Bank Rate ahead of reducing the Bank's portfolio of gilts.

Limits of monetary policy

Spencer Dale, Executive Director and Chief Economist, September 2012.

www.bankofengland.co.uk/publications/Documents/speeches/2012/speech597.pdf

In this speech, Spencer Dale discussed the role that monetary policy can play in the recovery from the financial crisis. He focused on the potential limits to the ability of monetary policy to stabilise the economy and the potential costs and side effects of running extremely loose monetary policy for a sustained period.

Mr Dale began by noting that the policy actions undertaken by the MPC have played a critical role in stabilising the UK economy. But he reminded the audience that the ability to use monetary policy as a stabilisation tool is limited by ignorance about how the economy works. In particular, Mr Dale explained that judging the appropriate policy response to a slowdown in output growth is far more complicated now than before the crisis, because the persistent weakness in output since the financial crisis has been accompanied by a period of very weak productivity growth. In that environment, the extent to which policy should be eased depends crucially on the reasons why output is weak, since the MPC's job is to hit an inflation target, not a growth target.

Moreover, Mr Dale noted that prolonged and aggressive monetary accommodation, combined with increasingly unconventional policy tools, also comes with potential costs and risks. Over longer periods of time, sustained loose monetary policy could lead to increases in the risk-taking of investors and financial institutions in a way that could store up problems for the future. It may also delay some of the rebalancing and restructuring that our economy needs to undertake. Mr Dale worried that unless the limits of monetary policy are well understood, a widening gap may develop between what is expected of central banks and what they can realistically deliver.

Appendices

Contents of recent Quarterly Bulletins

The articles and speeches that have been published recently in the *Quarterly Bulletin* are listed below. Articles from May 1994 onwards are available on the Bank's website at:

www.bankofengland.co.uk/publications/Pages/quarterlybulletin/default.aspx.

Articles and speeches

Speeches are indicated by (S)

2010 Q4
- The history of the *Quarterly Bulletin*
- Index of articles 1960–2010
- The UK recession in context — what do three centuries of data tell us?
- The Bank's money market framework
- Managing the circulation of banknotes
- Understanding the weakness of bank lending
- Evolution of the UK banking system
- The financial position of British households: evidence from the 2010 NMG Consulting survey
- The foreign exchange and over-the-counter interest rate derivatives markets in the United Kingdom
- Global finance after the crisis

2011 Q1
- Understanding the recent weakness in broad money growth
- Understanding labour force participation in the United Kingdom
- Global imbalances: the perspective of the Bank of England
- China's changing growth pattern
- Monetary Policy Roundtable

2011 Q2
- Assessing the risk to inflation from inflation expectations
- International evidence on inflation expectations during Sustained Off-Target Inflation episodes
- Public attitudes to monetary policy and satisfaction with the Bank
- The use of foreign exchange markets by non-banks
- Housing equity withdrawal since the financial crisis
- Using internet search data as economic indicators
- A review of the work of the London Foreign Exchange Joint Standing Committee in 2010

2011 Q3
- The United Kingdom's quantitative easing policy: design, operation and impact
- Bank resolution and safeguarding the creditors left behind
- Developments in the global securities lending market
- Measuring financial sector output and its contribution to UK GDP
- The Money Market Liaison Group Sterling Money Market Survey
- Monetary Policy Roundtable

2011 Q4
- Understanding recent developments in UK external trade
- The financial position of British households: evidence from the 2011 NMG Consulting survey
- Going public: UK companies' use of capital markets
- Trading models and liquidity provision in OTC derivatives markets

2012 Q1
- What might be driving the need to rebalance in the United Kingdom?
- Agents' Special Surveys since the start of the financial crisis
- What can the oil futures curve tell us about the outlook for oil prices?
- Quantitative easing and other unconventional monetary policies: Bank of England conference summary
- The Bank of England's Special Liquidity Scheme
- Monetary Policy Roundtable

2012 Q2
- How has the risk to inflation from inflation expectations evolved?
- Public attitudes to monetary policy and satisfaction with the Bank
- Using changes in auction maturity sectors to help identify the impact of QE on gilt yields
- UK labour productivity since the onset of the crisis — an international and historical perspective
- Considering the continuity of payments for customers in a bank's recovery or resolution
- A review of the work of the London Foreign Exchange Joint Standing Committee in 2011

2012 Q3
- RAMSI: a top-down stress-testing model developed at the Bank of England
- What accounts for the fall in UK ten-year government bond yields?
- Option-implied probability distributions for future inflation
- The Bank of England's Real-Time Gross Settlement infrastructure
- The distributional effects of asset purchases
- Monetary Policy Roundtable

2012 Q4
- The Funding for Lending Scheme
- What can the money data tell us about the impact of QE?
- Influences on household spending: evidence from the 2012 NMG Consulting survey
- The role of designated market makers in the new trading landscape
- The Prudential Regulation Authority

Bank of England publications

The Bank of England publishes information on all aspects of its work in many formats. Listed below are some of the main Bank of England publications. For a full list, please refer to our website:

www.bankofengland.co.uk/publications/Pages/default.aspx.

Working papers

An up-to-date list of working papers is maintained on the Bank of England's website at:

www.bankofengland.co.uk/publications/Pages/workingpapers/default.aspx

where abstracts of all papers may be found. Papers published since January 1997 are available in full, in portable document format (PDF).

No. 457 What do sticky and flexible prices tell us? (July 2012)
Stephen Millard and Tom O'Grady

No. 458 A network model of financial system resilience (July 2012)
Kartik Anand, Prasanna Gai, Sujit Kapadia, Simon Brennan and Matthew Willison

No. 459 Inflation and output in New Keynesian models with a transient interest rate peg (July 2012)
Charles T Carlstrom, Timothy S Fuerst and Matthias Paustian

No. 460 Too big to fail: some empirical evidence on the causes and consequences of public banking interventions in the United Kingdom (August 2012)
Andrew K Rose and Tomasz Wieladek

No. 461 Labour market institutions and unemployment volatility: evidence from OECD countries (August 2012)
Renato Faccini and Chiara Rosazza Bondibene

No. 462 Reputation, risk-taking and macroprudential policy (October 2012)
David Aikman, Benjamin Nelson and Misa Tanaka

No. 463 The international transmission of volatility shocks: an empirical analysis (October 2012)
Haroon Mumtaz and Konstantinos Theodoridis

No. 464 International policy spillovers at the zero lower bound (October 2012)
Alex Haberis and Anna Lipińska

No. 465 Size and complexity in model financial systems (October 2012)
Nimalan Arinaminpathy, Sujit Kapadia and Robert May

No. 466 QE and the gilt market: a disaggregated analysis (October 2012)
Martin Daines, Michael A S Joyce and Matthew Tong

No. 467 Factor adjustment costs: a structural investigation (October 2012)
Haroon Mumtaz and Francesco Zanetti

No. 468 Using Shapley's asymmetric power index to measure banks' contributions to systemic risk (October 2012)
Rodney J Garratt, Lewis Webber and Matthew Willison

No. 469 High-frequency trading behaviour and its impact on market quality: evidence from the UK equity market (December 2012)
Evangelos Benos and Satchit Sagade

External MPC Unit discussion papers

The MPC Unit discussion paper series reports on research carried out by, or under supervision of, the external members of the Monetary Policy Committee. Papers are available from the Bank's website at:

www.bankofengland.co.uk/publications/Pages/externalmpcpapers/default.aspx.

The following papers have been published recently:

No. 36 Did output gap measurement improve over time? (July 2012)
Adrian Chiu and Tomasz Wieladek

No. 37 Disaggregating the international business cycle (August 2012)
Robert Gilhooly, Martin Weale and Tomasz Wieladek

Monetary and Financial Statistics

Monetary and Financial Statistics (*Bankstats*) contains detailed information on money and lending, monetary and financial institutions' balance sheets, banks' income and expenditure, analyses of bank deposits and lending, external business of banks, public sector debt, money markets, issues of securities, financial derivatives, interest and exchange rates, explanatory notes to tables and occasional related articles.

Bankstats is published on a monthly basis, free of charge, on the Bank's website at:

www.bankofengland.co.uk/statistics/Pages/bankstats/default.aspx.

Further details are available from: Leslie Lambert, Statistics and Regulatory Data Division, Bank of England: telephone 020 7601 4544; fax 020 7601 5395; email leslie.lambert@bankofengland.co.uk.

Articles that have been published in recent issues of *Monetary and Financial Statistics* can also be found on the Bank's website at:

www.bankofengland.co.uk/statistics/Pages/ms/articles.aspx.

Financial Stability Report

The *Financial Stability Report* is published twice a year under the guidance of the interim Financial Policy Committee (FPC). It covers the Committee's assessment of the outlook for the stability and resilience of the financial sector at the time of preparation of the *Report*, and the policy actions it advises to reduce and mitigate risks to stability. The Bank of England intends this publication to be read by those who are responsible for, or have interest in, maintaining and promoting financial stability at a national or international level. It is of especial interest to policymakers in the United Kingdom and abroad; international financial institutions; academics; journalists; market infrastructure providers; and financial market participants. The *Financial Stability Report* is available at:

www.bankofengland.co.uk/publications/Pages/fsr/default.aspx.

Payment Systems Oversight Report

The *Payment Systems Oversight Report* provides an account of how the Bank is discharging its responsibility for oversight of recognised UK payment systems. Published annually, the *Oversight Report* identifies the most significant payment system risks to financial stability and assesses progress in reducing these risks. Copies are available on the Bank's website at:

www.bankofengland.co.uk/publications/Pages/psor/default.aspx.

Handbooks in central banking

The series of *Handbooks in central banking* provide concise, balanced and accessible overviews of key central banking topics. The *Handbooks* have been developed from study materials, research and training carried out by the Bank's Centre for Central Banking Studies (CCBS). The *Handbooks* are therefore targeted primarily at central bankers, but are likely to be of interest to all those interested in the various technical and analytical aspects of central banking. The *Handbook* series also includes '*Technical Handbooks*' which are aimed more at specialist readers and often contain more methodological material than the *Handbooks*, incorporating the experiences and expertise of the author(s) on topics that address the problems encountered by central bankers in their day-to-day work. All the *Handbooks* are available via the Bank's website at:

www.bankofengland.co.uk/education/Pages/ccbs/handbooks/default.aspx.

The framework for the Bank of England's operations in the sterling money markets (the 'Red Book')

The 'Red Book' describes the Bank of England's framework for its operations in the sterling money markets, which is designed to implement the interest rate decisions of the Monetary Policy Committee while meeting the liquidity needs, and so contributing to the stability of, the banking system as a whole. It also sets out the Bank's specific objectives for the framework, and how it delivers those objectives. The framework was introduced in May 2006. The 'Red Book' is available at:

www.bankofengland.co.uk/markets/Documents/money/publications/redbookjune2012.pdf.

The Bank of England Quarterly Model

The Bank of England Quarterly Model, published in January 2005, contains details of the new macroeconomic model developed for use in preparing the Monetary Policy Committee's quarterly economic projections, together with a commentary on the motivation for the new model and the economic modelling approaches underlying it.

www.bankofengland.co.uk/publications/Pages/other/beqm/default.aspx.

Cost-benefit analysis of monetary and financial statistics

The handbook describes a cost-benefit analysis (CBA) framework that has been developed within the Bank to ensure a fair balance between the benefits derived from good-quality statistics and the costs that are borne by reporting banks. Although CBA is a well-established approach in other contexts, it has not often been applied to statistical provision, so techniques have had to be adapted for application to the Bank's monetary and financial statistics. The handbook also discusses how the application of CBA has enabled cuts in both the amount and the complexity of information that is required from reporting banks.

www.bankofengland.co.uk/statistics/Pages/about/cba.aspx.

Credit Conditions Survey

As part of its mission to maintain monetary stability and financial stability, the Bank needs to understand trends and developments in credit conditions. This survey for bank and non-bank lenders is an input to this work. Lenders are asked about the past three months and the coming three months. The survey covers secured and unsecured lending to households and small businesses; and lending to non-financial corporations, and to non-bank financial firms. Copies are available on the Bank's website at:

www.bankofengland.co.uk/publications/Pages/other/monetary/creditconditions.aspx.

Trends in Lending

This quarterly publication presents the Bank of England's assessment of the latest trends in lending to the UK economy. The report draws mainly on long-established official data sources, such as the existing monetary and financial statistics collected by the Bank of England. These data have been supplemented by the results of a new collection, established by the Bank in late 2008, to provide more timely data covering aspects of lending to the UK corporate and household sectors. The report also draws on intelligence gathered by the Bank's network of Agents and from market contacts, as well as the results of other surveys. Copies are available on the Bank's website at:

www.bankofengland.co.uk/publications/Pages/other/monetary/trendsinlending.aspx.

Quarterly Bulletin

The *Quarterly Bulletin* provides regular commentary on market developments and UK monetary policy operations. It also contains research and analysis and reports on a wide range of topical economic and financial issues, both domestic and international. The *Quarterly Bulletin* is available at:

www.bankofengland.co.uk/publications/Pages/quarterlybulletin/default.aspx.

Inflation Report

The Bank's quarterly *Inflation Report* sets out the detailed economic analysis and inflation projections on which the Bank's Monetary Policy Committee bases its interest rate decisions, and presents an assessment of the prospects for UK inflation. The *Inflation Report* is available at:

www.bankofengland.co.uk/publications/Pages/inflationreport/default.aspx.

The *Report* starts with an overview of economic developments; this is followed by five sections:

- analysis of money and asset prices;
- analysis of demand;
- analysis of output and supply;
- analysis of costs and prices; and
- assessment of the medium-term inflation prospects and risks.

Publication dates

Publication dates for 2013 are as follows:

Quarterly Bulletin

Q1	14 March
Q2	13 June
Q3	17 September
Q4	17 December

Inflation Report

February	13 February
May	15 May
August	7 August
November	13 November

Financial Stability Report

26 June
28 November

ISSN 0005-5166
Printed by Park Communications Limited