Quarterly Bulletin

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BANK OF ENGLAND

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Topical articles

Bank funding costs: what are they, what determines them and why do they matter?

By Emily Beau of the Bank's Banking Policy Division, John Hill of the Major Banks and Insurers Sectoral Division, Tanveer Hussain of the Markets Directorate and Dan Nixon of the Bank's Media and Publications Division.[1]

- A bank needs to finance its activities, and the cost of bank funding affects a wide range of economic variables with important implications for both monetary and financial stability.
- This article sets out what bank funding costs are in simple terms, using an analogy of two buckets on a pair of scales to help explain the dynamic nature of bank funding and bank lending. It also introduces a simple framework for analysing the main drivers of funding costs.

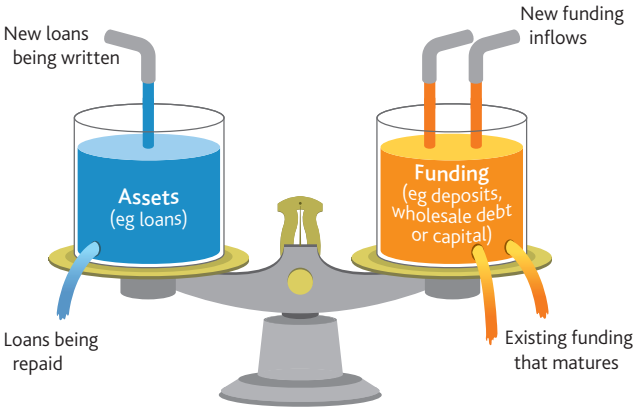
Overview

As with other types of company, a bank needs to finance its business activities — most notably making loans to households and firms — with some source of funding. Banks have a range of possible sources of funding available to them, including savers' retail deposits and investors' wholesale funding, as well as the bank's capital base.

Focusing on the cost of funding, this article explains in simple terms how to think about banks' funding costs and why they are of central importance to both monetary and financial stability. It is aimed at those seeking an introduction to what can often be a complicated issue. Banks' funding costs can affect the outlook for growth and inflation and hence are an important monetary policy consideration. This was clear in the wake of the recent financial crisis, when banks' funding costs rose markedly relative to risk-free interest rates, putting upwards pressure on lending rates.

Funding costs also matter for financial stability. A rise in funding costs reduces a bank's profitability if the bank chooses to absorb the higher costs by leaving its loan rates unchanged. Alternatively, banks may choose to pass on an increase in funding costs to borrowers by raising the rates charged on new lending. But this higher cost of credit could impact negatively on overall economic activity and, with higher costs of servicing debt, the number of borrowers that become unable to repay their loans may rise too. This would increase the credit losses faced by the bank, again weighing down on its profitability. Over time, a reduction in profitability could erode a bank's capital buffer, threatening its solvency and posing risks to financial stability.

Summary figure 'Buckets and scales' depiction of a bank's simplified balance sheet[a]



(a) For further description see **Figure 2** on page 373.

To visualise the dynamic nature of bank funding and bank lending, and how these interact, this article introduces the idea of two buckets filled with water to represent the bank's balance sheet (see **summary figure**). The article explains the analogy in more detail and uses it to work through some of the channels through which a change in banks' funding costs can impact on their profitability and broader macroeconomic and financial conditions.

To understand what drives a bank's cost of funding, the article introduces a simple framework to decompose funding costs into a risk-free rate, a risk premium and other costs.

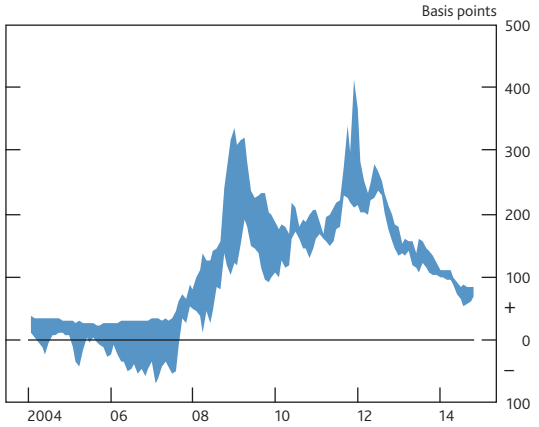
Click here for a short video that discusses some of the key topics from this article.

(1) The authors would like to thank Steve Perry for his help in producing this article.

Like any other type of company, a bank needs to finance its business activities with funding. However, the cost of funding faced by banks and building societies has particular significance for the rest of the economy because these funding costs are integral to the transmission mechanism of monetary policy and the outlook for growth and inflation. Banks' funding costs also matter for financial stability: they are monitored as part of the microprudential supervision of individual banks and building societies and they feed into an assessment of the risks to the stability of the financial system as a whole — and the implications for macroprudential policy.

Prior to the 2007–08 financial crisis, bank funding costs largely moved in line with 'risk-free' interest rates set by central banks, such as Bank Rate in the United Kingdom — the rate paid on reserves held by commercial banks at the Bank of England. In this environment, movements in risk-free rates provided a reasonably good guide to assessing both the transmission of monetary policy and changes in the profitability of banks. All of this changed with the onset of the financial crisis, however. Some sources of funding evaporated rapidly. And measures of bank funding costs rose sharply relative to risk-free rates. This can be seen in **Chart 1** which shows the sharp increase in a range of funding 'spreads' — the difference between funding costs and the risk-free rate — during the period from 2007 to 2011. This range has since fallen back somewhat but remains higher than in the period prior to the crisis.

Chart 1 Range of indicative measures of bank funding spreads[a]



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

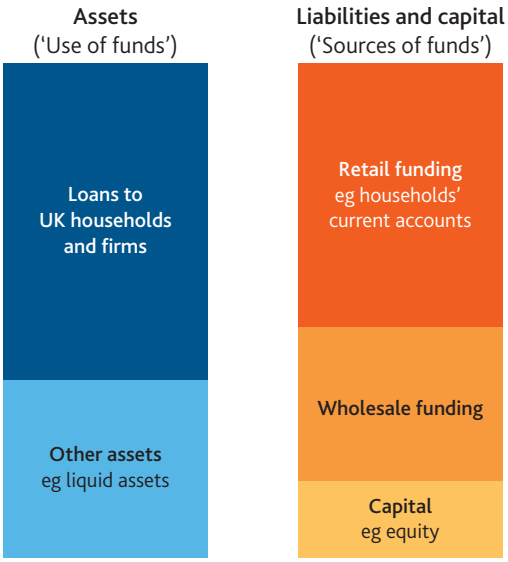
(a) The swathe includes three measures of long-term wholesale funding spreads for UK banks: the average of major UK banks' five-year euro-denominated senior CDS; quoted rates on one-year fixed-rate bonds over one-year swap rates for UK banks; and the Barclays Live 'Pan-Euro Corporate Banking: Senior – Spread' series.

This article explains bank funding costs assuming little prior knowledge of the banking system. It begins by describing the main sources of funding available in the context of banks' business models. It then explains the importance of funding costs for both monetary and financial stability, using the idea of buckets on a pair of scales as an analogy for thinking about the impact of changes in a bank's cost of funds. The third section sets out a framework for analysing the drivers of funding costs, by decomposing funding costs into risk-free rates and various 'risk premia'. The final section describes the general approach taken to monitoring banks' funding costs at the Bank of England. A short video explains some of the key topics covered in this article.(1)

Funding costs in the context of banks' business models

A bank's balance sheet provides a snapshot of its financial position at a given point in time. **Figure 1** illustrates a simplified balance sheet showing a bank's **sources of funds** (liabilities and capital) and its **use of those funds** (assets). As an accounting rule, total liabilities plus capital must equal total assets.

Figure 1 A stylised bank balance sheet[a]



(a) Derivatives are outside the scope of this article and so are not included in this illustration. However, for some banks, derivatives will form a sizable portion of the balance sheet.

A bank, like any other firm, can issue capital, for example share equity, giving investors a stake in the business. Equity investors will usually receive dividends — a share of the bank's profits — as a reward for investing. As well as ordinary shares in the firm, capital includes a bank's retained earnings and can be thought of as a bank's 'own funds' as it comprises funds that do not have to be repaid. A previous *Bulletin* article, 'Bank capital and liquidity', discusses this in more detail.(2)

Banks may also raise 'borrowed funds' which, in practice, represent the lion's share of a bank's total source of funds. This article focuses particularly on the cost to a bank associated with these sources of funding.

(1) http://youtu.be/kFtpWnpqqFA.
(2) See Farag, Harland and Nixon (2013).

Sources of bank funding: retail versus wholesale

Banks have a range of sources of borrowed funds available to them, which can be broadly categorised into retail and wholesale funding.(1)

Retail funding refers to the various types of deposits that households and small companies keep with a bank. This type of funding is 'unsecured', since depositors do not ask the bank to give them collateral as a guarantee for keeping hold of their money. It is also a form of funding that is specific to banking — and integral to what banks do, channelling savers' deposits to households and companies that wish to borrow. A bank's retail funding typically consists of a large number of individuals' savings, each of whom have relatively small sums of money available to deposit. Many depositors want to retain the ability to access some or all of their savings quickly — withdrawing cash from a branch or ATM, say, or making payments to other people electronically.

Banks can turn to **wholesale funding** markets when they wish (or need) to borrow funds in excess of their retail deposits or when they need to raise large amounts of funding quickly. Wholesale investors are typically more focused on obtaining a return from their investment in the bank — just as they would if they had invested in any other type of business — than desiring payment or safe-keeping services.

Wholesale funding for banks comes in many forms and there is a wide range of types of investors that provide it. A bank may receive unsecured deposits from other banks, large corporates, pension funds, insurance companies and other financial market participants. Alternatively, unsecured funds may be sourced from financial markets: in this case, rather than the financial investor depositing money with a bank, the bank issues a bond or other type of debt instrument that the investor buys. Examples include the issuance of short-term commercial paper and certificates of deposit or, for a longer time horizon, medium-term notes and bonds.

Banks can also access secured wholesale funding. This is funding that is backed by collateral: in the event that the bank gets into difficulties such that it is unable to repay the funds, the investor providing funds to the bank has recourse to certain (pre-agreed) assets held by the bank. A mortgage is a simple example of a secured loan, although in this case, the bank is the lender, and the borrower is a household. If a borrower cannot meet the repayments on the mortgage, the bank has recourse to the house. In a similar way to a household using a house as collateral to borrow funds from a bank, a bank can use its assets as collateral to borrow funds from investors.

Banks can raise secured funds in a number of ways. One common approach is via sale and repurchase or 'repo' transactions. In a repo transaction, a bank sells an asset, for example a government bond, and agrees to buy it back on a specified date at a higher price. Economically, this is essentially a secured loan: the counterparty has recourse to some collateral (the bond it has purchased) until the repurchase date. And the difference between the sale and repurchase price is the counterparty's compensation for providing funds to the bank — and the cost of funding for the bank.

Many banks also pool together illiquid assets, such as loans, and transform them into tradable securities in order to raise funds — a process known as securitisation. Banks most commonly securitise mortgages, to create mortgage-backed securities (MBS).(2) MBS are tradable in the secondary mortgage market — which is very large and liquid — allowing banks to raise funds secured against their (otherwise illiquid) mortgage assets.(3)

Different types of banks rely on different types of funding

Banks operate a range of business models, which lead them to have very different asset and liability structures. The value of a bank's assets will reflect all the financial assets that it currently holds (such as banknotes) as well as all of the inflows it is due to be paid in the future, such as loan repayments.(4) Assets are shown on the left-hand column of **Figure 1**. In a traditional, retail-focused bank, assets mainly comprise lending to households and firms, in the form of mortgages, personal loans, business loans and so on. Larger banks operating this business model usually rely on a mix of retail deposits and wholesale funding. For smaller banks and building societies, the range of funding options is typically more limited and in some cases their options are restricted by law. Building societies, for example, are required to be at least 50% funded by household deposits.

At the other end of the spectrum, an investment bank will not typically accept retail deposits and its balance sheet can be quite complex. It is more likely to raise funds from wholesale funding markets, including secured funding. Some of these funds will be used to provide credit to other financial institutions such as retail banks and hedge funds, typically through secured lending markets. An investment bank will also use the funds to finance transactions in equity and debt

(1) This article does not cover the cost of funding derivatives positions. Derivative contracts entered into by a bank do not immediately appear on its balance sheet as typically they start with zero net value. However, as the market value of the underlying entity changes over time, the contract may result in an asset (a debt owed to the bank by the counterparty as a result of the bank's gain on the contract) or a liability (a debt owed to the counterparty by the bank as a result of the bank's loss on the contract). For more information, see Hull (2008).
(2) MBS are collateralised by the underlying mortgage pool, which can be divided into a number of 'tranches'. These can be structured to suit different investors' risk appetites. For further explanation of how asset-backed securities (ABS) are structured, see Hull (2008), pages 536–40.
(3) The 'secondary market' refers to a market where investors purchase existing securities or assets from other investors. A 'primary market' is one where investors purchase new assets from the issuing companies themselves.
(4) In addition, a bank may hold physical assets (such as the buildings it operates from) and 'intangible' assets, which include things like the brand value of the firm.

securities with other financial market participants, often acting as an intermediary in the markets for those securities.

Why do bank funding costs matter for monetary and financial stability?

While a balance sheet shows a bank's source of funds and use of funds at a given moment, in reality, both sides of a bank's balance sheet will be evolving over time. In order to understand why bank funding, and changes in the cost of bank funding, are so important, it is necessary to grasp the dynamic nature of a bank's assets and liabilities — and the interaction between them.

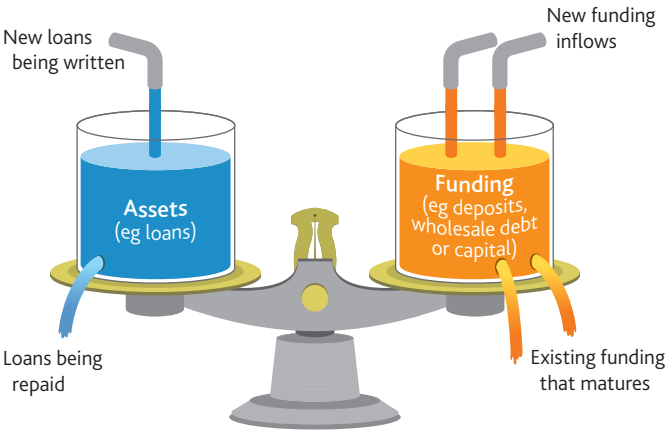
For instance, an inherent part of the traditional banking business model is the fact that a bank's assets typically have much longer maturities than its liabilities: customers are due to repay their bank loans (the bank's assets) over a long period of time, whereas depositors and investors in a bank may — in many cases — withdraw their money (the bank's funding) at much shorter notice — or even 'on demand'. Given this 'maturity mismatch' between assets and liabilities, then, a continuing challenge for banks is to ensure that new funding replaces maturing funding in similar amounts, and in a timely manner, in order to continue to support a relatively stable pool of assets.(1)

An analogy: buckets and scales

To visualise the dynamic nature of bank funding and bank lending — and how these interact — it can help to think of each side of a bank's balance sheet as a bucket filled with water, as shown in **Figure 2**. To capture the dynamics, each bucket has a tap (or taps) at the top and a hole (or holes) in the bottom to represent the inflow and outflow of assets and funding each time period. So the taps above the orange bucket represent the flow of new funding that people are placing with the bank, and the outflow from the bottom shows funding leaving the bank — when depositors withdraw their funds or contracts with wholesale investors mature. Since the bank's capital is a source of funding, it too features in the orange bucket (although, as noted above, in contrast to 'debt funding', capital does not need to be repaid). For the asset bucket, the tap represents the flow of new assets, such as new loans being written. The hole in the bottom represents the outflow of assets from the bank's balance sheet, which happens as a loan is repaid.

It is important to bear in mind that many types of transactions involving a commercial bank will bring about changes to *both* sides of its balance sheet simultaneously. For instance, a customer paying in cash to his or her current account would increase both the bank's assets (in this case, the bank's holdings of banknotes) and the bank's stock of outstanding funding (retail deposits): there would be an inflow to both

Figure 2 'Buckets on scales': a simplified illustration of a bank's assets and funds(a)



(a) This is a simplified analogy designed to illustrate some basic concepts relating to the dynamics of bank funding and lending. It does not show every type of funding or asset that might feature on a bank's balance sheet.

buckets in **Figure 2**. Another example where both buckets fill up simultaneously is when a bank makes an additional loan. On the asset side, this represents the blue bucket filling up. In a sense, this might seem counterintuitive given that a new loan involves funds *leaving* the bank, not entering. But from the perspective of the bank's balance sheet, the loan represents an agreement that the customer will repay a certain amount over the lifetime of the loan, hence features as an inflow into the blue bucket. On the funding side, meanwhile, the orange bucket fills up when a loan is written since the loan creates — at least in the first instance — additional bank deposits of the same amount: a bank authorising a loan to someone for £1 million, say, credits the borrower's bank account with that amount.(2) Conversely, when a customer withdraws cash or a loan from a customer's account is repaid, the water level in both buckets would go down. This would also happen when a borrower is unable to repay what he or she owes, forcing the bank to write off the loan. This would reduce the bank's assets and, at the same time, enter as a hit to the bank's capital buffer on the funding side, causing the outflows from both buckets simultaneously.(3)

More generally, the accounting rule that total assets must equal total liabilities plus capital is illustrated on **Figure 2** by the buckets being balanced on a pair of scales. Over time, the overall size of the bank's balance sheet — the stock of loans outstanding, or the stock of funding, whichever way one looks

(1) Some other important considerations for banks' funding strategies, such as diversification across types of investor or counterparty, are not covered in this article.
(2) Of course, those funds may not remain on that particular bank's balance sheet for long: the borrower might use them to transfer money to someone that uses a different bank, say. For further details on how lending creates deposits, and implications of this for the aggregate banking sector compared to individual lenders, see McLeay, Radia and Thomas (2014).
(3) Capital may be 'topped up', on the other hand, when the bank retains some of the earnings (including the interest that customers pay on loans) that it makes on its assets over a given period, leading — in the first instance, at least — to a rise in cash (on the asset side of the balance sheet) and capital (on the funding side). See Farag, Harland and Nixon (2013).

at it — could increase (the buckets fill up), decrease (the buckets drain) or stay the same. For a bank to maintain its balance sheet at a constant size, it needs to ensure that it tops up its funding (and new loans that are written) at the same rate that existing funding is withdrawn (and existing loans are repaid): in **Figure 2**, the buckets stay at the same level if the inflow from the taps matches the outflow from the buckets' holes.

As mentioned above, an ongoing challenge for a bank is to keep the funding side of its balance sheet 'topped up' given that its funding is typically of a shorter maturity than its lending. **In the context of the buckets analogy, this means that in order to keep both buckets at the same level, the inflows — and outflows — of funding in each period will be greater than the inflows and outflows of assets.** This is sometimes described as the liabilities side of the bank's balance sheet 'turning over' more quickly than the assets side. In **Figure 2**, this is shown by water flowing into the orange bucket from two taps — with two holes from which funding leaks out; the rate of turnover in the blue bucket is slower (one tap, one hole) as new loans are written and existing ones repaid less often.

Introducing funding costs and banks' profitability

A bank's cost of funding is the price it must pay to replace its liabilities. But it is helpful to distinguish between (i) the cost of an additional unit of funding — the **marginal funding cost**; and (ii) the cost of the existing stock of funding (that is, the accumulation of past flows of funding that have yet to mature) — the **average funding cost**.

Like other types of business, banks try to manage their balance sheets so that they maximise their profits — that is, the difference between revenue earned on assets and any associated costs. And the cost of funding is typically the starting point for a bank considering what interest rate to charge on a particular type of loan.(1) For a bank with a traditional business model, then, a useful gauge of profitability is calculated as the difference between the average price of lending and the average cost of funding. This metric is sometimes referred to as the 'net interest margin'. This means that if the price a bank has to pay for new funding rises then, assuming it keeps its lending rates unchanged, its net interest margin — its profitability — will fall. The size of the impact will depend both on how much the marginal cost of funding rises but also on how great the flow of new funding is relative to the stock of existing funding, since this determines how much the marginal cost of funding impacts on the average funding cost.

The buckets analogy can be used to work through the implications of a change in banks' funding costs for their profitability, for financial stability and for monetary stability. **Figure 3** considers a large, systemically important bank that operates a traditional banking model. **In this stylised example, the size of the bank's balance sheet — the water level of the buckets — will depend, principally, on how much lending the bank can carry out profitably for a given amount (and cost) of funding.** The percentage figures represent the interest rates associated with the inflows and outflows of loans and funds.

The top panel of **Figure 3** describes the situation before the bank is hit by a shock to its funding costs. Inflows equal the outflows each period so that the buckets stay at a constant level. The bank charges a 5% interest rate on its loans and pays out 3% interest on its funding — leaving it a net interest margin of 2 percentage points. It is then assumed that conditions in the bank's wholesale funding markets deteriorate sharply, with investors now only willing to lend the bank funds at a much higher rate of 7%.

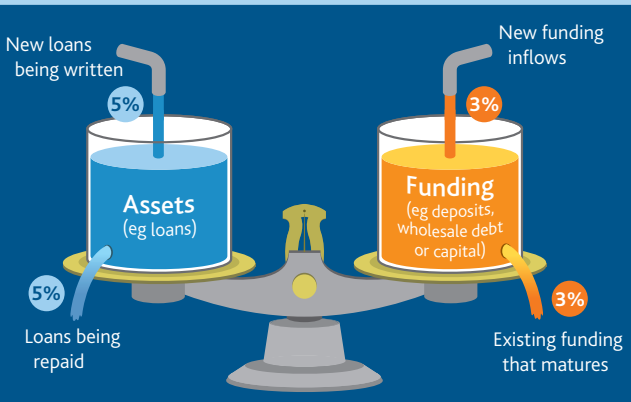
Figure 3 considers three possible outcomes to this situation:

- **Scenario 1**: the bank absorbs the higher cost of funding, reducing its profitability.
- **Scenario 2**: the bank passes on the higher funding cost to the price of any new lending, and borrowers are willing to pay higher interest rates on any new loans taken out.
- **Scenario 3**: the bank attempts to pass on the increased costs, but finds no demand for loans at the higher interest rate.

It is important to note that the scenarios shown make a number of simplifying assumptions. There are other possible options for how a bank could respond to this situation beyond those illustrated in **Figure 3**, for instance.(2) Moreover, the transmission of higher funding costs is highly stylised: in the case where the bank responds by passing the increased costs on to higher loan rates, Scenarios 2 and 3 illustrate the extreme cases where demand for loans is either completely unaffected by the higher price level, or else demand dries up entirely. In practice, it would likely fall somewhere between the two. More generally, it is important to note that a wide range of other factors (beyond those shown **Figure 3**) will influence the markets for bank funding and bank lending.(3) Even so, the examples serve to illustrate some of the main channels through which an unexpected spike in bank funding costs might impact macroeconomic and financial conditions.

(1) To set the interest rate offered to its customers, the bank will then add to its cost of funding any compensation it requires to account for the risk that not all firms or households may repay their loans in full; any operating costs the bank incurs; and any mark-up over and above these costs. See Button, Pezzini and Rossiter (2010).
(2) For example, the bank might be able to find other, less expensive sources of funding to replace the funding that has increased in cost to 7%. Alternatively, the bank might cease to renew funding at the higher rate — reducing the size of its balance sheet — but do so in a way in which it continues to write the same amount of new loans (in other words, running down other, non-loan assets on its balance sheet).
(3) See for example McLeay, Radia and Thomas (2014).

Figure 3 What are the implications of a spike in a bank's funding costs?(a)



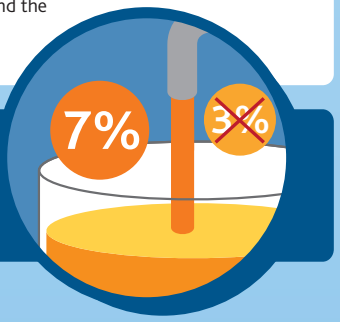
Note: the numbers show the interest rates associated with inflows and what was being paid on outflows of loans and funding.

(i) Before the shock to funding costs

Each period, outflows of from each bucket — assets and funding — are matched one-for-one by inflows, so the water level in the buckets remains constant.

The bank pays an annual interest rate of 3% for its funding. This applies both to inflows of new funding (from the tap above the orange bucket) and on the bank's existing stock of funding (inside the orange bucket). The outflow from the bucket shows funding that matures — it is repaid to investors — and, alongside it, the rate that was being paid on this funding.

On its loans, the bank charges an interest rate of 5%. Again this is charged on new loans that are written (the inflows into the blue bucket) and the existing stock of loans.



(ii) The bank's funding costs increase sharply

Investors become concerned about the future solvency or liquidity position of the bank, leading them to require greater compensation in return for providing new funding. The cost of new funding rises from 3% to 7%. There are a number of ways in which the bank could respond.

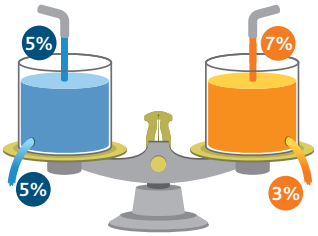
The bank absorbs the costs, reducing its profitability

The bank passes on the increased costs to borrowers

Scenario 1

The bank chooses to keep the price of new loans unchanged at 5%.

As a result, it is now making a loss on all new lending. Quantities are unchanged though: the rates of inflow and outflow remain the same. Both buckets remain at the same level.



Note: the numbers show the interest rates associated with inflows and what was being paid on outflows of loans and funding.

Implications

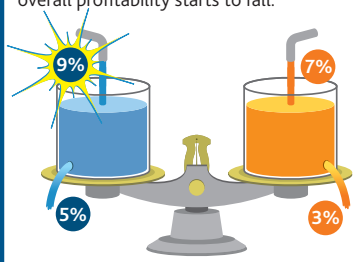
- Maintaining the price of new lending at 5% means that all new loans are loss-making, reducing the bank's overall profitability.
- Over time this could erode its capital base, threatening the bank with insolvency and posing risks to financial stability.

Scenario 2

The bank raises the rates it charges on new loans from 5% to 9%.

This scenario assumes that borrowers continue to demand the same quantity of lending from the bank at this higher rate, so the buckets remain at the same level.

The bank maintains the same profit margin on new lending as it had previously, but overall profitability starts to fall.



Note: the numbers show the interest rates associated with inflows and what was being paid on outflows of loans and funding.

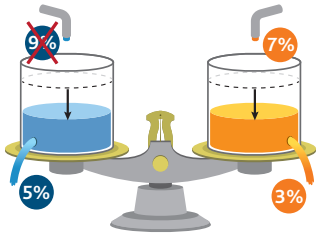
Implications

- The higher cost of credit reduces households' incomes and firms' profits, leading to lower economic activity, with implications for monetary stability.
- The increased cost of servicing loans could lead to more borrowers becoming unable to repay their loans in the future. The bank would incur credit losses, eroding its capital and posing risks to financial stability.

Scenario 3

The bank attempts to pass on increased costs to borrowers, but finds no demand for loans at the higher rate of 9%.

The inflow into the asset bucket dries up. The outflow continues as existing loans are repaid, though, and the bucket starts to drain. On the funding side, the bank stops raising new funding at the same rate and the bucket drains at the same rate.



Note: the numbers show the interest rates associated with inflows and what was being paid on outflows of loans and funding.

Implications

- The reduction in lending leads to lower consumption, investment and overall economic activity, with implications for monetary stability.
- Reduced economic activity causes borrowers problems in repaying existing loans — and losses for the bank. Profits are also lower as bank's balance sheet shrinks. The bank's capital is eroded, posing risks to financial stability.

(a) The analogy used here makes a number of simplifying assumptions relating to the bank's balance sheet and the transmission of the funding costs shock, discussed on page 374. Moreover, for simplicity, the diagrams shown here do not reflect the fact that turnover on the funding side of the balance sheet is faster than on the assets side. This point would cause a rise in funding costs to push down on the bank's profitability over and above the channels illustrated here (which is discussed on page 376).

Funding costs and financial stability

The Bank has a statutory objective to protect and enhance the stability of the financial system of the United Kingdom. The Bank's financial stability objective includes two angles: first, the Prudential Regulation Authority (PRA) has a general objective to promote the safety and soundness of individual banks and building societies — **microprudential regulation**.(1) And second, the Financial Policy Committee (FPC) is charged with taking action to remove or reduce systemic risks with a view to protecting and enhancing the resilience of the UK financial system as a whole — **macroprudential policy**.(2) Funding costs are relevant to both of these aspects of the Bank's financial stability remit.

Typically, a sudden, sharp rise in bank funding costs is likely to have an adverse effect on financial stability. In Scenario 1 of **Figure 3**, the bank chooses to absorb the increase in its funding costs, keeping the interest rate it charges on new loans unchanged. This means that new loans become loss-making: the bank is paying 7% on its funding, but charging only 5% on its loans. This will reduce the bank's overall profitability and, eventually, will start to erode its capital base.(3) If this situation continues for long enough, the bank might face solvency difficulties, which could have a destabilising effect on the financial system.

Alternatively, the bank could attempt to pass some of the increase in funding costs to its customers by charging higher rates on any new lending. But even then, it is likely that the bank's overall profitability and capital would be affected, with implications for financial stability. For one thing, the fact that funding turns over more quickly than assets (as illustrated in **Figure 2**) means that in reality, even if the bank passes on the higher *marginal* funding costs to its customers when it makes any new loans, its *average* funding cost will rise faster than its average price of lending — pushing down on the bank's overall profitability. This applies in *all* of the scenarios considered.(4) In addition to this point:

- In Scenario 2, the bank is able to continue writing the same amount of new loans each period at the new higher rate, preserving the bank's net interest margin. But since the cost of servicing debt for any households and firms taking out a new loan is now higher, it is likely that more borrowers in the future will run into problems repaying their loans — leading the bank to incur higher credit losses.

- In Scenario 3, the bank finds that there is no demand for additional loans at the higher interest rate: the tap above the blue bucket is turned off. As the bank's balance sheet starts to shrink, this in itself will reduce the bank's profits over time. In addition, the credit crunch leads to lower economic activity — including lower incomes for households and lower profits for businesses. This would likely lead to higher credit losses for the bank as existing borrowers struggle to repay their loans.

An increase in credit losses — arising from either of these scenarios — would erode the bank's capital base which, as described above, could pose risks to financial stability. The FPC stands ready to take action to remove or reduce any risks that arise which threaten the stability of the financial system.

To complement these purely illustrative thought experiments, the box on page 377 discusses the empirical link between banks' funding costs and banks' resilience to withstand adverse shocks. The recent financial crisis serves as a useful case study for investigating this relationship because the rise in funding spreads varied markedly across different banks. The box finds evidence that **banks facing higher funding costs tended to be those banks with weaker capital positions**. This finding is consistent with the conclusions from **Figure 3**, although the observed, empirical relationship is likely to reflect causality in the other direction as well: that is, banks with weak capital positions were forced to pay up more for their funding. The next section of this article discusses the determinants of funding costs in more detail.

While lower funding costs in general may be beneficial from a financial stability perspective, regulators must also ensure that banks do not fund their activities in ways that lead to excessive risk-taking. Unsustainably low funding costs might lead banks to offer lending at unsustainably low rates that fuel excessively high levels of credit growth. Some of the cheapest sources of funding, such as short-term wholesale funding, are also the most risky. These funding sources may be short in duration and likely to 'dry up' and become unavailable during times of stress. More generally, levels of funding costs that are unusually low may be a warning sign that risk in the banking sector is being underpriced.

Funding costs and monetary stability

In most inflation-targeting regimes, the central bank aims to achieve monetary stability by setting monetary policy in order to meet an inflation target over the medium term.

(1) The PRA is a subsidiary of the Bank and is responsible for the supervision of banks, building societies and credit unions, insurers and major investment firms. See Bailey, Breeden and Stevens (2012).
(2) See Tucker, Hall and Pattani (2013).
(3) The bucket diagrams do not work through (graphically) the erosion of bank capital, which would start to happen once the bank's overall profitability becomes negative. Once this happens, the cash inflows from the bank's loans would not meet the cash outflows paid out on the bank's funding, leading to a simultaneous reduction in the bank's cash on the assets side (for simplicity, the blue buckets focus on loans, but in practice would reflect the full mix of assets on the bank's balance sheet) and bank capital on the funding side of the balance sheet. For illustrative scenarios that capture more fully the different parts of a bank's balance sheet (in the context of solvency and liquidity problems) see Farag, Harland and Nixon (2013).
(4) To keep it simple, this turnover point is not shown in **Figure 3**, where both buckets have one tap and one hole. But to illustrate this channel through which profitability would be affected, one could draw the orange buckets in **Figure 3** with two taps and two holes (compared to one for the blue buckets), as depicted in **Figure 2**. In Scenario 3, for instance, this would mean that in order for the orange bucket to drain at the same rate as the blue bucket, the bank would need to continue to keep *one* of the taps above the orange bucket turned on (given that it has two holes) — despite no new lending taking place. This would mean raising some new funding at the higher rate of 7%, weighing down on the bank's net interest margin. This mechanism would work in a similar way to reduce the net interest margin in the other scenarios.

Bank resilience and funding costs

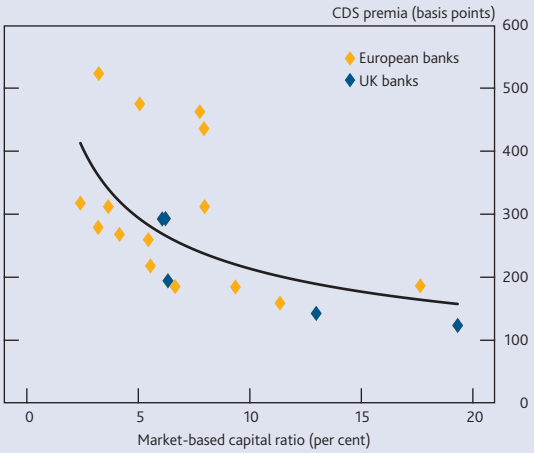
There is an important link between bank resilience and bank funding costs. Drawing on evidence presented in the June 2012 *Financial Stability Report*, this box investigates the link by looking at the relationship between spreads on banks' credit default swaps (CDS), as a proxy for funding costs, and banks' market-based capital ratios, as an indicator of banks' resilience to adverse economic shocks.(1)

A CDS is a derivative contract that typically provides insurance against non-payment (that is, default) of a bond.(2) The buyer of this protection makes payments (known as paying the CDS 'spread') to the seller. If the reference bond defaults, the buyer of the CDS receives a payout — typically equal to the face value of the bond — and the seller may take ownership of the bond. CDS spreads increase when the reference bonds become more risky and so can be used to gauge investors' perceptions of a bank's credit risk, serving as a proxy for the bank's cost of wholesale funding.(3)

Bondholders providing funding to banks are more likely to be repaid in full when banks are more resilient to shocks to the value of their assets. More resilient banks should therefore tend to face lower funding costs; and sellers of protection on these bonds will demand lower premia — as they are less likely to have to pay out. This can be seen in **Chart A**: banks with higher market-based capital ratios (a market measure of resilience) tend to have lower CDS premia.(4)

CDS premia are less sensitive to a given shock to the value of a bank's assets when market-based capital ratios are higher, though: this is shown by the line of best fit in **Chart A** flattening off at higher capital ratios. This is likely to reflect the fact that more resilient banks can more easily absorb shocks to the value of their assets without impairing their ability to repay bondholders in full. In the extreme, the likelihood that bondholders will be repaid in full following a small shock to the value of a bank's assets may be unaffected when banks have very high market-based capital ratios. Better-capitalised banks' funding costs will therefore tend to remain relatively lower and more stable following shocks to the value of their underlying assets.

Chart A Market-based capital ratios and funding costs(a)(b)(c)(d)

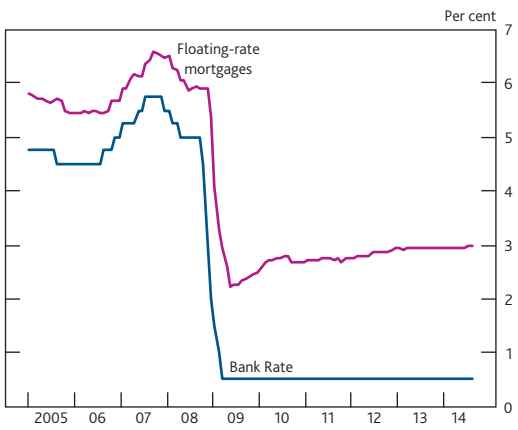


Sources: Capital IQ, Markit Group Limited, published accounts and Bank calculations.

(a) This chart is taken from the June 2012 *Financial Stability Report* (*FSR*).
(b) The sample shown is the largest 20 European banks by assets (at the time of the June 2012 *FSR*).
(c) The sample shown is the largest 20 European banks by assets.
(d) Funding costs are proxied by five-year senior CDS premia. The 'line of best fit' shown above illustrates their relationship with market-based capital ratios.

(1) This point in time serves well to illustrate the relationship because there was a reasonable amount of variation in the data across banks for each of these variables. The broad relationship identified here has continued to hold since that time.
(2) CDS can also be used to provide insurance against a range of alternative credit events.
(3) The relative demand for these instruments is also an important consideration. This is discussed in more detail in the box on page 382.
(4) For more on capital ratios as a measure of a bank's resilience, see Farag, Harland and Nixon (2013).

Chart 2 Bank Rate and a representative mortgage interest rate for UK banks(a)



(a) 'Floating-rate mortgages' refers to mortgages in which the interest rate paid varies based on a specified benchmark, for example Bank Rate.

This is typically carried out by setting the central bank's policy interest rate (Bank Rate in the United Kingdom). This policy rate affects short-term market interest rates and, in turn, influences a range of interest rates set by commercial banks, building societies and other institutions — as well as the price of financial assets, such as bonds and shares, and the exchange rate. By affecting consumer and business demand in a variety of ways, all of this feeds into the aggregate level of spending and inflationary pressure in the economy.(1) In the United Kingdom, the Bank of England is responsible for monetary stability — defined by the Government's inflation target of 2% — and the Monetary

(1) For example, if inflation were projected to be below target two or three years ahead, the central bank might lower the interest rate it controls, leading commercial banks to lower the rates they charge to savers and borrowers. This makes it cheaper for households and businesses to borrow (and less attractive to save), boosting the aggregate amount of economic activity and inflationary pressure in the economy. See www.bankofengland.co.uk/monetarypolicy/Pages/how.aspx.

Policy Committee (MPC) sets the level of Bank Rate each month. As explained below, bank funding costs are integral to the transmission of monetary policy and the outlook for growth and inflation.

As discussed in the introduction, commercial banks' lending rates often move in tandem with Bank Rate. In **Chart 2**, this can be seen over the period leading up to the recent financial crisis: up until October 2008, the average interest rate charged on floating-rate mortgages moved closely in line with changes in Bank Rate. But it is a bank's cost of funding that is the key input into its loan rates — and a bank's cost of funding may change even when Bank Rate remains unchanged. In response to the financial crisis, for instance, Bank Rate was reduced sharply, from 5% in September 2008 to 0.5% in March 2009. While the interest rates charged on new lending to households also fell, they did not fall by nearly as much (**Chart 2**). In large part, this was due to the marked increase in funding costs over this period (shown in **Chart 1**), relative to Bank Rate.

Of the three scenarios considering higher funding costs shown in **Figure 3**, two result in direct consequences for economic activity. In Scenario 2, households and businesses taking out new loans will need to spend more of their disposable income servicing debt, leaving less money to spend on everything else; and in Scenario 3, the rise in the cost of credit may lead to a credit crunch — all new lending from this bank ceases, which would act to reduce consumption and investment. In addition, any scenario that causes banks solvency problems and creates risks to financial stability will also threaten the outlook for monetary stability. Reflecting this point, the recent crisis demonstrated the painful effects on economic conditions that can be brought about by financial instability — in part, but not solely, working via the impact of elevated funding costs on credit conditions.

Stressed funding conditions: the cost versus the volume of funding

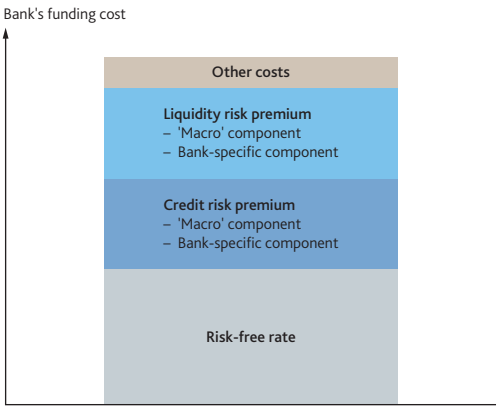
The initial shock to funding conditions worked through in **Figure 3** focuses on the cost of bank funding. In Scenario 3, higher funding costs bring about a reduced inflow of new funding (via a reduction in the demand for new loans at the higher interest rate). But in reality, the nature of the shock to funding markets could manifest itself more directly via funding volumes from the outset. If investors are sufficiently concerned about threats to a bank's solvency or liquidity position, for example, they may withdraw funding, whatever the price: the funding tap would run dry and the bank would be shut out of the funding market entirely. Indeed, supporting this idea, market intelligence suggested that funding markets became more 'binary' in recent times of stress and were often likely to be either 'on' (banks could raise funding) or 'off' (banks were unable to raise funding at any price), rather than banks being rationed by the price of funding.

A conceptual framework for analysing funding costs

Having reviewed some of the ways in which funding costs matter, this section presents a conceptual framework for thinking about the main drivers of funding costs. In general, a bank's cost of funding reflects the compensation that investors and depositors demand in exchange for financing a bank's activities. So in order to understand the determinants of banks' funding costs, it is useful to keep in mind that when a bank issues a bond, say, from the point of view of an investor the bond is an asset and the interest rate is the return on their investment.

The cost of funding can be decomposed into a risk-free component, a combination of credit risk and liquidity risk premia, and other costs (**Figure 4**). The risk premia are influenced by a combination of general, 'macro' factors (such as the broad economic outlook, or an increase in the riskiness of the banking sector) and factors that are idiosyncratic to any given bank, such as a business model focused on a particularly risky type of lending. Taken together, the risk-free rate and the risk premia generally account for the bulk of overall funding costs. They are discussed in turn below, with a focus on wholesale funding costs; many of the same factors drive retail interest rates, but there are also some differences, which are discussed below. Other elements that need to be considered to calculate the total, 'all-in' costs of wholesale funding, such as the costs of hedging interest rate and currency risks, are discussed in the box on page 379.

Figure 4 A breakdown of the components of bank funding costs(a)



(a) Relative sizes of components are purely illustrative.

There are a number of ways in which central bank policies can affect bank funding costs. Monetary policy determines the risk-free rate and both monetary and macroprudential policy can affect the other components of funding costs. A full discussion of these channels is beyond the scope of this

The 'all-in' costs of wholesale funding

Given the range of options available to banks when raising wholesale funding, it is important to be able to compare these in a way that takes into account all costs. This box focuses on various elements that need to be considered to calculate the 'all-in' costs of wholesale funding.

The **direct cost** of raising funding is the interest the bank must pay for that funding. For bonds, this is the coupon paid by the issuing bank and includes the risk-free rate and risk premia (see the main text of the article). 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. But a bank will usually have paid a slightly higher cost to that implied by secondary market prices to increase the attractiveness of the instrument to investors. This is often called the 'new issue' premium.

These direct costs are reflected in the yield of the bond. But the 'true' or 'all-in' cost of funding includes a number of additional **indirect costs**, which are not reflected in the yield.

For example, a UK bank may issue a bond denominated in US dollars, and which pays a fixed interest rate — both features that might suit demand for the bank's bonds from its investor base. However, if the bank's assets are mostly denominated in sterling, it will generally prefer to have its funding in sterling, too, to avoid currency 'mismatch'. A bank would typically hedge the currency risk associated with issuing in a non-domestic currency: in the example above, by finding a financial market participant that is willing to swap the dollars the bank receives from its investors for the equivalent amount in sterling.

In addition, banks generally prefer to pay out floating-rate interest payments on their funding instruments in order to reduce interest rate risk. Again, banks usually hedge the risk incurred when issuing a fixed-rate bond — in this case by entering into an interest rate swap to switch the proceeds of the bonds from fixed-rate to floating-rate cash flows.

There are various other indirect costs, including 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 legal costs associated with structuring a transaction and preparing the legal documentation containing the terms and conditions of the bonds. Finally, there may be costs associated with 'overcollateralisation' of secured funding. This is discussed in more detail in Churm *et al* (2012), which also presents Bank staff estimates of 'all-in' funding costs for different types of funding that underpinned the design of the Funding for Lending Scheme.

article but other publications have explored these themes in more detail.(1) Indeed, some policy initiatives have been designed and implemented directly in order to influence banks' funding costs. For example, in response to the sharp increase in banks' funding costs experienced during the financial crisis, the Bank of England launched the Funding for Lending Scheme in order to incentivise banks and building societies to boost their lending to UK households and firms by providing them with funding for an extended period, at below market rates.(2)

The components of bank funding costs

Risk-free rates

As discussed in the previous section, inflation-targeting central banks usually seek to implement monetary policy by setting an interest rate (Bank Rate in the United Kingdom) that affects short-term market interest rates. This interest rate can be viewed as the 'risk-free' rate given that the risk of the central bank defaulting is generally considered to be the lowest of any agent in the economy. While Bank Rate is the short-term policy rate set each month by the MPC, risk-free rates also encompass rates at a longer time horizon (such as the risk-free rate over the coming five years, say): in this case, the risk-free rate reflects market participants' expectations of future policy rates.

Because risk-free rates are a common component of funding costs for all types of bank funding, it is common to refer to bank funding 'spreads' — the difference between funding costs and an appropriate risk-free rate. Monitoring developments in funding spreads is particularly useful because they will typically be driven by different factors to those that influence risk-free rates.

Credit risk premium

When buying bank debt, investors demand compensation for bearing the risk that the bank will default on its debt ('credit risk') over and above the risk-free rate of return. This compensation is the credit risk premium. It may rise if investors judge that, relative to the amount of capital a bank has, the bank's use of funds (its assets) has become riskier. This is because the greater the risks a bank takes relative to its buffer of loss-absorbing capital, the greater the risks to the investors themselves in funding the bank.(3)

(1) For more on how monetary policy determines risk-free rates, see Bank of England (2014) and McLeay, Radia and Thomas (2014). For details on how credit spreads (in turn influenced by funding costs) feed into the MPC's projections for growth and inflation, see Butt and Pugh (2014). For the transmission of macroprudential capital policy to funding costs, see Harimohan and Nelson (2014).
(2) See Churm *et al* (2012).
(3) See Farag, Harland and Nixon (2013) for more details. One subcomponent of the credit risk premium is the term premium: investors typically require greater compensation the longer the term (maturity) of an investment, because there is a higher chance of a counterparty defaulting over a long time horizon than a short one.

An individual bank's credit risk premium will rise relative to its peers when investors consider it to have become relatively more risky.(1) Alternatively, a number of banks' credit risk premia may rise together when investors consider the banking sector as a whole to have become more risky.(2) This could be due to changes in the macroeconomic environment — for example, if a country enters into recession, a larger proportion of households and companies will experience difficulties repaying loans compared to a period of economic growth. This would translate into higher credit losses for those banks conducting business in that country.

Whether banks seek funding on a secured or an unsecured basis will also affect the level of credit risk premia that investors demand. As explained in the first section of this article, if an investor lends money to a bank on a secured basis then, in the event that the bank cannot repay the funds, the investor's losses will be mitigated by having recourse to collateral. This significantly reduces credit risk and credit risk premia.

Liquidity risk premium

Liquidity, in the context of assets, is the degree to which an asset can be converted to cash quickly, at any time, without affecting its price. **Liquidity risk**, then, is the risk that an asset may only be converted to cash at short notice subject to a substantial reduction in its price. Since debt instruments issued by banks are held as assets by investors, these assets' perceived liquidity influences the price investors are prepared to pay for them.

Investors demand liquidity because they are uncertain about when they might need access to their funds — to invest in a new project, say — and hence how long they wish to hold a given asset for. The more liquid the assets that investors hold, the more investors are effectively insured against this uncertainty.(3) Conversely, investors demand compensation in the form of a liquidity risk premium in exchange for investing in illiquid assets. This applies to bonds issued by banks as it does to other financial assets that investors hold.

A key determinant of the liquidity risk premium is the maturity of an asset. All else equal, an investor will typically demand more compensation for holding an asset that matures in one year than for holding an otherwise identical asset that matures in one month: this 'term liquidity risk premium' is demanded in return for the inconvenience of not being able to access these funds for a longer period of time.

As with credit risk premia, liquidity risk premia are affected by both idiosyncratic and macro risk factors. The idiosyncratic component of the term liquidity risk premium depends on factors such as how frequently the bank's debt is traded in secondary markets. Investors are likely to demand a higher liquidity premium when investing in a bond issued by a small institution that has few other instruments in issue, compared to investing in a bond issued by a large institution. This is because there are fewer investors who are likely to wish to hold this bond — it may be difficult to sell it on at a later date. Meanwhile, liquidity risk premia might rise across the banking sector as a whole when investors become less confident that the bank funding instrument in which they are investing will retain its value. For example, during an economic downturn or a financial or political crisis, investors typically place an extremely high value on liquidity.

Wholesale versus retail funding costs

As a starting point for understanding retail funding costs, the same conceptual framework developed in this section so far can be used. Moreover, one would expect the level of retail funding costs to be broadly similar to the level of wholesale funding costs at a given point in time (for a given maturity and currency of funding). If this were not the case, banks would move away from the more expensive sources of funding and the additional demand for cheaper types of funding would bid up their price.(4) Some key distinguishing features of retail funding, however, mean that their cost may differ from wholesale funding costs in practice.

In many instances, deposits provide a relatively cheap source of funding for banks because, unlike wholesale investors, households and companies do not just hold deposits at banks to gain a return on these funds. This is particularly true for 'sight' deposits such as current accounts, which provide customers with a safe place to keep their savings and the option to withdraw cash or make electronic payments directly from their account. Depositors demand less compensation (that is, lower interest rates) in exchange for leaving their money in these accounts than the amount banks need to pay out for other sources of funding. Banks will typically need to pay out more in the case of 'time' deposits that have a contractual maturity (such as a three-year fixed-rate retail savings account), since depositors demand a larger term liquidity risk premium — and hence a higher interest rate — in exchange for locking their money away for a given period of time.

Another factor pushing down on retail funding costs relative to wholesale funding costs is deposit guarantees. Eligible deposits carry a very small credit risk premium because,

(1) This, in turn, might be affected by factors such as the amount and quality of information that the bank discloses about its activities and its management of risks. See Sowerbutts and Zimmerman (2013).
(2) See Federal Reserve Bank of San Francisco (2009).
(3) See Diamond and Dybvig (1983).
(4) Alternatively, savers might move their money away from the savings products offering lower rates of interest. For instance, if a bank paid out an annual rate of 5% on a three-year fixed-rate bond in wholesale markets, say, but offered only 2% on three-year time deposits to retail savers, then in a competitive market for savings products there would likely be an investment fund of some sort that would pool together individuals' savings and invest these in the bond (giving a rate of 5%). All else equal, then, the rates paid by the bank for retail and wholesale funding would converge over time.

should a bank fail, a depositor is entitled to receive compensation from the Financial Services Compensation Scheme (FSCS) up to the value of £85,000.(1) In addition, in the event that a bank becomes insolvent, a hierarchy exists to determine how the bank's remaining funds are distributed out to its creditors — with households and small business depositors usually the first to be compensated. Therefore depositors bear much less risk compared to other creditors in the event of a bank defaulting.

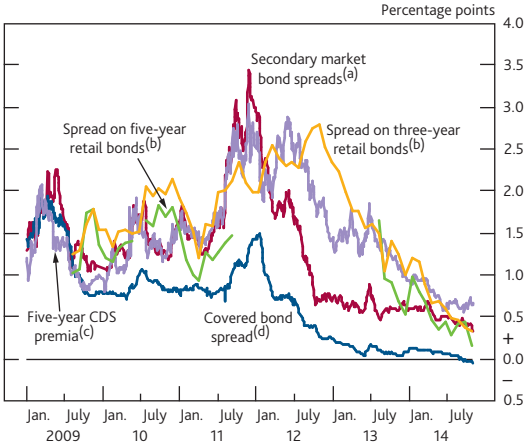
As with wholesale funding, however, there are other, indirect costs that feed in to the overall cost of retail funding. In part, these are the costs associated with providing the safe-keeping and payments services that banks provide to retail customers, such as the fixed cost to a bank of maintaining its branch and ATM network. While it is difficult to measure these additional costs precisely, they are likely to make the overall cost of deposits, particularly longer-term deposits, more comparable to that of other sources of funding.

Monitoring banks' funding costs: the Bank of England's approach

Given the implications that banks' funding conditions can have for monetary and financial stability — and therefore for the policy stances of the MPC and FPC — Bank staff look at a range of measures to estimate the aggregate level of funding costs facing banks operating in the United Kingdom. In addition, bank supervisors in the PRA monitor the funding costs facing individual institutions (alongside a range of other metrics) in order to help promote the safety and soundness of these firms. The measures that Bank staff look at cover a range of wholesale and retail funding sources, at various maturities and across different currencies. Funding costs incurred across all existing liabilities (average funding costs) are monitored in relation to banks' current profit margins. The cost of new funding (marginal funding costs), meanwhile, is monitored to gauge the future profitability of a bank as well as the outlook for credit conditions facing borrowers in the economy.

Economic theory would suggest that different sources of funding (at a given maturity and currency) should cost banks the same amount, all else equal. In practice, however, the differing characteristics of different funding markets and, in some cases, segmentation of certain markets means that sizable gaps can open up between different measures of funding costs. To form a more accurate view of the level of funding costs — and changes in these costs — the Bank therefore closely monitors a wide range of different measures. **Chart 3** shows a range of indicative measures of long-term funding costs typically monitored by the Bank. Each of these are expressed as spreads over the risk-free rate of the appropriate maturity.

Chart 3 Long-term funding spreads for major UK banks



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

(a) Constant-maturity unweighted average of secondary market spreads to mid-swaps for the major UK lenders' five-year euro senior unsecured bonds, where available. Where a five-year bond is unavailable, a proxy has been constructed based on the nearest maturity of bond available for a given institution. The gap in the time series between 1 December 2009 and 11 January 2010 is because no suitable bonds were in issuance in that period.
(b) Spreads for sterling fixed-rate retail bonds over equivalent-maturity swaps. Bond rates are end-month rates and swap rates are monthly averages of daily rates. The bond rates are weighted averages of rates advertised by the banks and building societies in the Bank of England's quoted rates sample, for products meeting the selection criteria (see www.bankofengland.co.uk/statistics/Pages/iadb/notesiadb/household_int.aspx). The series for the five-year bond is not included for May 2010 and August 2011 to April 2013 as fewer than three institutions in the sample offered products in these periods.
(c) The data show an unweighted average of the five-year senior CDS premia for the major UK lenders, which provides an indicator of the spread on euro-denominated long-term wholesale bonds.
(d) Constant-maturity unweighted average of secondary market spreads to mid-swaps for the major UK lenders' five-year euro-denominated covered bonds, where available. Where a five-year covered bond is unavailable, a proxy has been constructed based on the nearest maturity of bond available for a given institution.

One of commercial banks' most important sources of finance is long-term unsecured wholesale funding. The Bank tracks unsecured wholesale funding costs by monitoring secondary market spreads on two main types of instrument: unsecured bonds and credit default swaps (CDS). Whereas CDS spreads are proxies for funding costs, bond spreads are based on the actual costs facing banks — but data on them are more limited. The box on page 382 explains the difference between these measures and reasons why they can sometimes diverge. **Chart 3** also shows covered bond spreads, which represent a measure of the cost of secured wholesale funding:(2) as one would expect, these represent a cheaper source of funding than unsecured bond spreads.

The Bank publishes a wide range of data on retail deposit rates that the Bank's statistical area collects directly from banks and building societies.(3) These include data on rates relating to sight deposits, and a wide range of term products such as time deposits, cash Individual Savings Accounts (ISAs) and fixed-rate bonds. Data are collected on both 'quoted' and

(1) The Bank recently announced plans to extend protection under FSCS to include large temporary balances (such as following the sale of a property) of up to £1 million. The Bank also outlined rules to ensure depositors are able to move their accounts swiftly in the event that their bank is resolved. More information can be found at www.bankofengland.co.uk/pra/Pages/publications/cp/2014/cp2014.aspx.
(2) Covered bonds give investors recourse to a pool of assets that secures (or 'covers') the bond in the event that the issuer of the bond defaults.
(3) See the Bank's Statistical Interactive Database; www.bankofengland.co.uk/boeapps/iadb/newintermed.asp.

Measuring unsecured wholesale funding costs

Both CDS spreads and senior unsecured bond spreads can be used as a gauge of a bank's wholesale funding costs. Most of the time, both measures imply a broadly similar level for wholesale funding costs: this can be seen in **Chart 3** over the 2009–11 period, for instance.

On occasion, however, CDS premia diverge from senior unsecured bond spreads — sometimes markedly. For example, spreads on UK banks' senior unsecured debt declined sharply relative to CDS in early 2012. This reflected factors specific to the CDS and unsecured bond markets, which are 'segmented' in the sense that different market participants will determine the prices that prevail. The marked reduction in bond spreads relative to CDS in early 2012 reflected a reduction in new bank bond issuance at a time when investor demand remained strong: this pushed up on bond prices, and bond yields (and hence spreads) declined.(1) The reduction in banks' supply of bonds, in turn, was related to the European Central Bank's longer-term refinancing operation (LTRO) and the Funding for Lending Scheme, both of which provided banks with an alternative source of funds.

Market contacts have indicated that banks use secondary market spreads on existing bonds to calculate the marginal cost of wholesale funding. This is because they more directly capture what it would cost for a bank to issue a bond in present market conditions, in contrast to CDS spreads which are proxies for actual funding costs (see the box on page 377 for more details). But relying on secondary market bond spreads as an indicator of funding spreads over time presents some challenges: to be consistent, measures of funding costs based on existing bonds should refer to the same currencies and maturities at all points in time — and it is difficult to find data that are consistent over time in this way.(2)

One ideal solution is to use an average of the spreads on specific benchmark bonds (for example, five-year maturity bonds issued in euros). But banks do not always have a bond outstanding at the exact desired maturity, making time-series comparisons potentially misleading. To address this, analysts in the Bank have constructed an indicator of the cost of wholesale funding based on secondary market senior unsecured bond spreads that, as far as possible, proxies a constant maturity. This is the measure shown by the red line in **Chart 3**.

(1) The price of the bond and the bond's yield are inversely related. See, for example, Mishkin (2004).
(2) Consistent time-series data for CDS spreads, on the other hand, are readily available. The Bank monitors five-year CDS spreads as these are the most liquid CDS contracts.

'effective' rates. Quoted rates are the rates advertised on new savings products. For example, the Bank monitors quoted rates on three and five-year retail bonds alongside measures of wholesale funding costs (**Chart 3**), with the chosen maturities aligned as closely as possible to the average maturities of wholesale funding instruments. Effective rates data reveal the rates that, on average, banks have actually been paying households and companies that have deposited money with them. These are particularly useful for assessing the interest paid on the outstanding stock of retail deposits held by banks.

The Bank's choice of indicators of bank funding costs is regularly reviewed to ensure that it remains focused on the most relevant ones. For example, as banks have increased the proportion of retail funding raised at longer maturities, Bank staff have put more weight on longer-dated retail funding indicators in their overall assessment of funding costs.

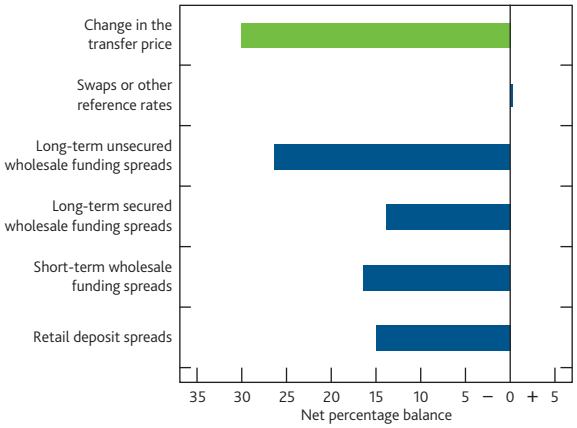
Market and supervisory intelligence and the *Bank Liabilities Survey*

In addition to monitoring these data, the Bank of England uses intelligence from market and supervisory contacts to inform its understanding of developments in banks' liabilities. The Bank also produces the *Bank Liabilities Survey*, which is a quarterly survey of developments in UK banks' and building societies' funding positions (including capital). The survey provides information on the factors underlying developments in the price and quantity of funding raised and on non-price terms and conditions.(1) It also sheds light on the pass-through of the cost of funding (raised externally) to the internal cost of funds that banks' treasuries make available to individual business units that are responsible for particular types of lending (such as mortgage lending). This is sometimes referred to as a bank's internal 'transfer price'.

For example, **Chart 4** shows that on average over the past two years, the net balance of lenders reported a fall in the transfer price (shown in green). Beneath that, it shows some of the factors cited as having affected this price. Falling spreads on both wholesale and retail funding are reported as having helped drive down the cost of providing funds to internal business units over the past two years. Among other things, these indicators can help to inform a view about the future availability and cost of loans to households and companies provided by banks.(2)

(1) For more information, see Bell, Butt and Talbot (2013).
(2) See Butt and Pugh (2014) for more details.

Chart 4 Change in banks' internal 'transfer price' and factors affecting it since the end of 2012[a]



(a) The chart shows average net percentage balances from the *Bank Liabilities Survey* from 2012 Q4 (when the survey began) up to 2014 Q3. Negative balances indicate that banks, on balance, reported the transfer price (in green) or underlying funding costs (in blue) to have decreased.

Conclusion

This article has introduced bank funding costs in the context of banks' business models and presented a conceptual framework to help understand their main drivers. Funding costs are integral to the transmission mechanism of monetary policy and the outlook for growth and inflation. They are equally important for the Bank's assessment of financial stability. Funding costs are therefore central to many aspects of the Bank's work, whatever the economic and financial conjuncture.

Looking ahead, the likely normalisation of monetary policy at some point,[1] the introduction of new liquidity metrics and the phasing in of higher capital requirements ahead of the full implementation of the Basel III capital framework in 2019 all have the potential to affect the outlook for funding costs. In time, some policies put in place during the crisis are also likely to be removed and may affect banks' cost of funds. These examples underline why it is important for Bank staff to continue to monitor closely a wide range of measures of bank funding costs.

(1) See the box on pages 42–43 of the August 2014 *Inflation Report*; www.bankofengland.co.uk/publications/Documents/inflationreport/2014/ir14aug5.pdf.

References

Bailey, A, Breeden, S and Stevens, G (2012), 'The Prudential Regulation Authority', *Bank of England Quarterly Bulletin*, Vol. 52, No. 4, pages 354–62, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/qb120405.pdf.

Bank of England (2014), 'The Bank of England's Sterling Monetary Framework', available at www.bankofengland.co.uk/markets/Documents/money/publications/redbook.pdf.

Bell, V, Butt, N and Talbot, J (2013), 'The Bank of England *Bank Liabilities Survey*', *Bank of England Quarterly Bulletin*, Vol. 53, No. 1, pages 68–76, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2013/qb130107.pdf.

Butt, N and Pugh, A (2014), 'Credit spreads: capturing credit conditions facing households and firms', *Bank of England Quarterly Bulletin*, Vol. 54, No. 2, pages 137–47, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2014/qb14q203.pdf.

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, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/qb100301.pdf.

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, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/qb120401.pdf.

Diamond, D and Dybvig, P (1983), 'Bank runs, deposit insurance, and liquidity', *Journal of Political Economy*, Vol. 91, No. 3, pages 401–19.

Farag, M, Harland, D and Nixon, D (2013), 'Bank capital and liquidity', *Bank of England Quarterly Bulletin*, Vol. 53, No. 3, pages 201–15, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2013/qb130302.pdf.

Federal Reserve Bank of San Francisco (2009), 'Behaviour of Libor in the current financial crisis', *FRBSF Economic Newsletter*, Number 2009–04, 23 January.

Harimohan, R and Nelson, B (2014), 'How might macroprudential capital policy affect credit conditions?', *Bank of England Quarterly Bulletin*, Vol. 54, No. 3, pages 287–303, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2014/qb14q303.pdf.

Hull, J (2008), *Options, futures and other derivatives*, 7th edition, Prentice-Hall.

McLeay, M, Radia, A and Thomas, R (2014), 'Money creation in the modern economy', *Bank of England Quarterly Bulletin*, Vol. 54, No. 1, pages 14–27, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2014/qb14q102.pdf.

Mishkin, F (2004), *The economics of money, banking, and financial markets*, 7th edition, The Addison-Wesley series in economics.

Sowerbutts, R and Zimmerman, P (2013), 'Banks' disclosure and financial stability', *Bank of England Quarterly Bulletin*, Vol. 53, No. 4, pages 326–35, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2013/qb130404.pdf.

Tucker, P, Hall, S and Pattani, A (2013), 'Macroprudential policy at the Bank of England', *Bank of England Quarterly Bulletin*, Vol. 53, No. 3, pages 192–200, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2013/qb130301.pdf.

Why is the UK banking system so big and is that a problem?

By Oliver Bush of the Bank's Macroprudential Strategy and Support Division, Samuel Knott of the Bank's Stress Testing and Strategy Division and Chris Peacock of the Prudential Regulation Authority's International Banks Supervision Directorate.[1]

- Over the past 40 years the size of the UK banking system has grown dramatically and under plausible assumptions it could continue to grow rapidly.
- This article examines a number of issues related to the size of the UK banking system, including why it is so big and what empirical evidence tells us about the relationship between banking system size and financial stability. This evidence suggests that while size can be important, it is the resilience of the banking system that is key for financial stability.

Overview

Over the past 40 years the size of the UK banking system has undergone a dramatic shift, with total assets rising from around 100% to around 450% of nominal GDP. It is plausible that the UK banking system will continue to grow rapidly.

Though there are a number of ways to define the size of a banking system, on each standard metric the UK banking system is large relative to most other major economies. What also makes the UK banking system stand out is its international nature: not only are foreign banks a particularly large part of the UK banking system, but UK banks have large operations abroad.

Why is the UK banking system so big? One reason is that the wider financial system has benefited from firms and people locating near one another in clusters. Partly as a result, the United Kingdom may be able to provide banking services more efficiently than other countries. In other words, it may have a 'comparative advantage' in international banking services. A first mover advantage may also have played a role: the pre-eminence of the UK financial system can, in part, be traced back to the rise of London as a financial centre in the 18th and 19th centuries. Another possible reason for the size of the UK banking system has been the implicit government subsidy associated with banks that are too big to fail. This can lead to an oversupply of banking services relative to the amount that would be most beneficial for society.

From the Bank of England's perspective, it is important for the Financial Policy Committee and Prudential Regulation Authority to understand how much banking system size matters for financial stability. The empirical analysis in this article does not find a strong link between banking system size and the probability or output cost of a crisis, at least once the resilience of the system is taken into account. In line with other evidence, low leverage ratios (equity divided by total assets) and periods of high credit growth are found to have been more robust leading indicators of banking crises. But the direct fiscal costs associated with banking crises have tended to be larger for big banking systems. Furthermore, evidence from the crisis suggests that the structure of the banking system — for example, the mix of domestic banks and foreign subsidiaries and branches — can also matter for financial stability.

The importance of the resilience of the banking system for financial stability is why the Bank of England, in conjunction with other organisations including the Financial Stability Board, is pursuing a wide-ranging set of reforms to improve the resilience of the banking system, including to remove the implicit government subsidy.

Click here for a short video that discusses some of the key topics from this article.

(1) The authors would like to thank Jamie Coen and Catherine Shaw for their help in producing this article.

Over the past 40 years the size of the UK banking system has undergone a dramatic shift, with total assets rising from around 100% to around 450% of GDP. And it is plausible that the UK banking system will continue to grow rapidly.

Some have suggested that the current size of the UK banking system represents a material risk to economic stability and that action should be taken to reduce its size. This position is prompted, in part, by the fact that the recent economic downturn was the deepest and most prolonged since the Great Depression, and that this contraction was preceded by a banking crisis. In a speech last year, Governor Carney noted this view, but argued that the United Kingdom can host a large and expanding financial sector safely if comprehensive reforms are implemented to underpin its resilience.(1)

This article attempts to shed light on this debate by examining a number of issues related to banking system size and resilience. The first section sets out some metrics of the size of the UK banking system, and projects how big it might become under some simple but plausible assumptions. The second section examines why the UK banking system has become so large. The third section analyses the relationship between banking system size and financial stability. The final section concludes. A short video explains some of the key topics covered in this article.(2)

How big is the UK banking sector?

The size of a banking system is often measured by the sum of assets held by banks on their balance sheets.(3) These assets include loans to households and companies, as well as securities, such as bonds and equities, and other assets. How different types of assets are measured, among other factors, can have a material impact on estimates of banking system size.(4) Banking assets are often expressed as a share of nominal GDP. While there is no mechanical link between the two variables, this gives a measure of the size of a banking sector relative to overall economic activity.(5)

Broadly speaking, there are two commonly used definitions of banking system size. Applied to the United Kingdom, these are:

- **Ownership basis** — this typically includes UK-owned monetary financial institutions' total assets, including the assets of their non-resident branches and subsidiaries, but excludes the assets of foreign-owned banks' UK subsidiaries and branches.

- **Residency basis** — defined as assets of monetary financial institutions located in the United Kingdom regardless of the nationality of their ultimate owner. This includes UK-owned banks' UK assets and the (UK) assets of foreign banks' UK subsidiaries and branches.

While different definitions produce different sizes, there are three key features of the UK banking system that emerge regardless of the definition used, summarised on **Figure 1**.

First, the UK banking system is big (top panel of **Figure 1**). Looking at a sample of countries comprising the United States, Japan and the ten largest European Union countries, the United Kingdom has the largest banking sector on a residency basis.(6) Relative to GDP, it stood at around 450% in 2013 compared to 100% in 1975.

Second, foreign banks are a particularly large part of the UK banking system. This is arguably its defining feature. There are 150 deposit-taking foreign branches and 98 deposit-taking foreign subsidiaries in the United Kingdom from 56 different countries. Foreign banks constitute around half of UK banking sector assets on a residency basis, with the combined assets of the largest ten foreign subsidiaries in the United Kingdom (including their non deposit-taking entities) totalling around £2.75 trillion.(7) Foreign branches account for around 30% of total UK-resident banking assets and around a third of UK interbank lending. Nearly a fifth of global banking activity is booked in the United Kingdom, and UK-resident banks' foreign assets and liabilities account for over 350% of UK GDP, more than four times the median figure for Organisation for Economic Co-operation and Development (OECD) countries. Some of these statistics are shown on the left-hand panel of **Figure 1**.

Third, non-loan assets constitute a high proportion of total UK banking assets (right-hand panel of **Figure 1**). Only around half of UK-owned banks' assets are loans to non-bank borrowers. For the largest foreign subsidiaries in the United Kingdom, this figure is even lower: less than 10% of assets are loans to non-bank borrowers, with derivatives and reverse repos representing around 60% of assets.(8) The flipside of this asset composition is that only around half of UK-owned banks' liabilities are customer deposits; derivatives and interbank deposits are the next largest liabilities. As a result, there is a significant difference between the gross size

(1) See Carney (2013).
(2) http://youtu.be/Qs0GYqWMXv4.
(3) Some measures of the banking system use 'total claims' rather than 'total assets' — 'claims' is a narrower measure which excludes certain assets, such as gold bullion and fixed assets.
(4) For example, the value of the largest UK banks' derivative exposures varies between roughly £80 billion and £110 trillion depending on how they are measured. The £80 billion figure refers to banks' reported derivatives exposures after netting assets and liabilities with the same counterparty and collateral placed, whereas the £110 trillion figure is banks' reported notional value of derivatives — defined as the face amount that is used to calculate payments made on the derivative. Data are as of end-2013 and include Barclays, Lloyds Banking Group, HSBC and Royal Bank of Scotland.
(5) One part of the measure is a stock concept (total banking assets) and the other part is a flow concept (annual GDP). Throughout this article GDP refers to nominal GDP.
(6) The UK banking sector is also relatively large on an ownership basis, at around 350% of GDP in 2013.
(7) Foreign deposit-taking subsidiaries account for around 15% (£1 trillion) of total UK-resident banking assets.
(8) A reverse repo involves the purchase of securities, with an agreement that the purchaser will sell the securities back to the seller at an agreed date in the future.

of the UK banking system and the net size once exposures between banks are taken into account.

An alternative way of measuring the size of a sector is by its share of output. These data are easier to obtain for the financial sector as a whole (which as well as banks includes other financial institutions such as asset managers) than for the banking sector. That said, measuring the output share of the financial sector is not straightforward and involves a number of assumptions. **Chart 1** shows that the UK financial sector is large by international standards on the basis of gross value added (a measure of the contribution to the economy of a particular sector). But, again, what really distinguishes it is its international nature. **Chart 2** shows that the United Kingdom's net trade in financial services far outstrips that of other (OECD) countries.

How big might the UK banking system become?

Looking ahead, any judgement on the size of the UK banking system needs to consider its potential trajectory as global economic integration and financial deepening continues. This requires a model of how economies might grow in the future and how their demand for financial services may change as a result. To get a sense of how these factors might evolve, we use a simple three-step framework that was employed in Haldane (2011). While this framework is simplistic — for instance it omits a number of factors, such as the evolution of future regulation and demographic changes — it can be used

Figure 1 How big is the UK banking system?

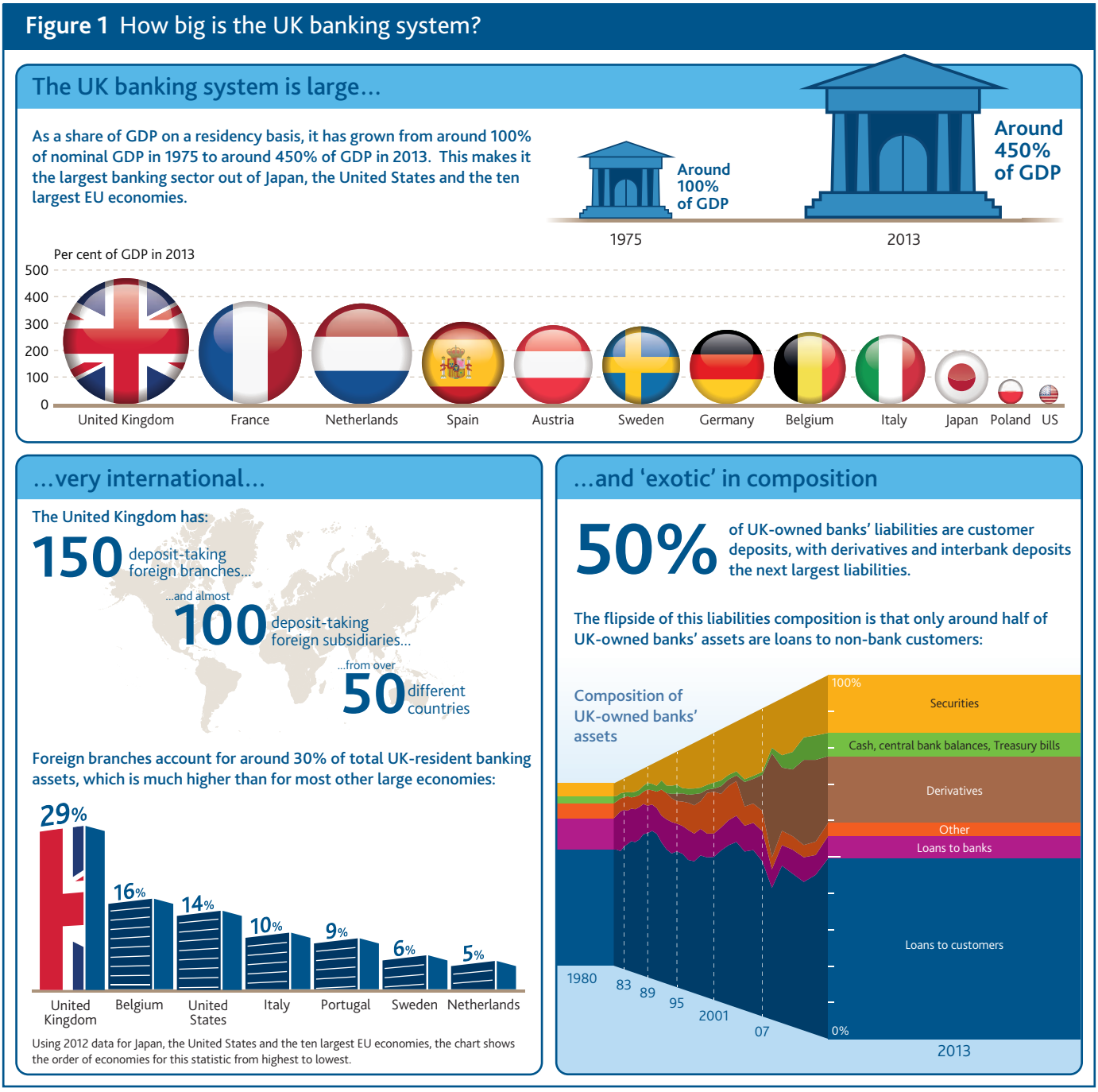
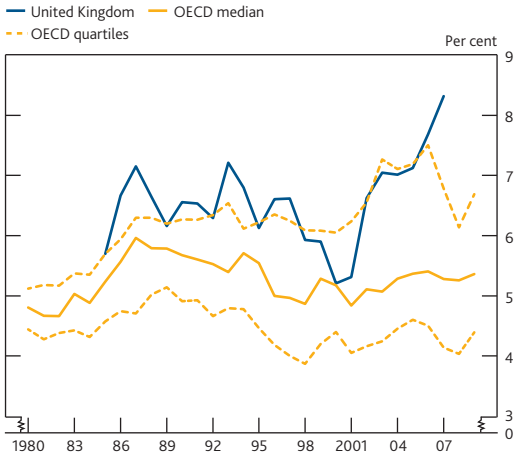


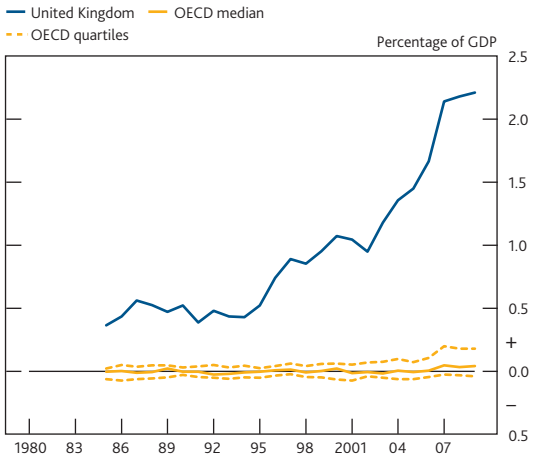
Chart 1 Financial sector share of gross value added[a]



Sources: OECD and Bank calculations.

(a) OECD figures exclude Chile and Turkey. Figures may not be fully comparable due to differences in accounting for Financial Intermediation Services Indirectly Measured.

Chart 2 Net trade in financial services[a]



Sources: OECD and Bank calculations.

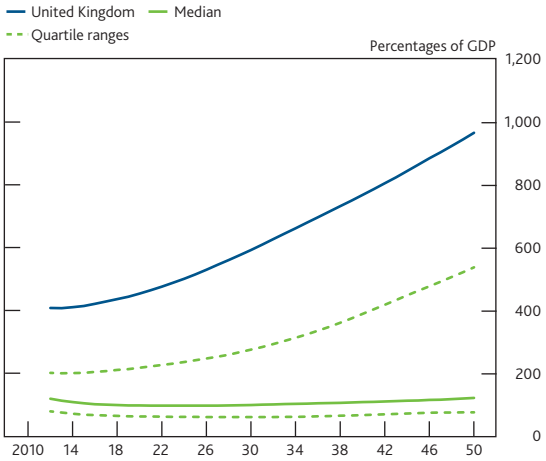
(a) OECD figures exclude Chile and Turkey. Figures may not be fully comparable due to differences in accounting for Financial Intermediation Services Indirectly Measured.

to provide a rough idea of how the size of the UK banking system might evolve over time.[1]

In the first step, we project how individual countries' income per capita might converge over time towards the income per capita of a chosen advanced economy (here taken to be the United States).[2] In the second step, we use each country's projected path for income per capita to project forward its ratio of financial assets to GDP, based on the historical relationship between these two variables for each country. Consistent with the first step, we assume that when a country's income per capita reaches the level of the United States, then its financial depth will also be equal to that of the United States (a proxy for 'steady-state' financial depth) which on our definition is around 425% of GDP. In the final step, we project forward the size of individual G20 banking systems by assuming that they grow in line with G20 financial assets.

Using this framework, **Chart 3** shows that the size of the UK banking system might roughly double from its current size to over 950% of GDP by 2050, far outstripping the projected increase in other G20 banking systems. In money terms this would represent a rise in UK banking assets from over £5 trillion to around £60 trillion. The main drivers of this result are the relatively large share of global banking assets that the United Kingdom currently has, coupled with the projection of global financial deepening. So not only is the UK banking system big now; based on plausible assumptions, including that the United Kingdom retains its share of global banking services, it could get substantially bigger.

Chart 3 Projected size of G20 banking systems[a][b]



Sources: European Central Bank, SNL Financial and Bank calculations.

(a) For detail on the methodology see the main text.
(b) For consistency with other G20 countries, this chart shows banking system size on an ownership basis. The starting value for the United Kingdom is 410% of GDP.

Why is the UK banking system so big?

To assess the potential impact of the size of the UK banking system on financial stability it is important to identify what factors have led the UK banking system to its current size, and which of them may affect its future growth.

This article identifies four main factors: the benefits from clustering in financial hubs; comparative advantage; historical factors; and the implicit subsidy associated with 'too big to fail' (TBTF) banks. The first three of these factors are closely related to the international nature of the UK banking system.

The benefits of financial hubs

One factor behind the existence of international financial centres, including the United Kingdom, is likely to be the gains from clustering, when firms and people locate near one

(1) The framework also assumes that the relative sizes of countries' banking systems are fixed over time. While this is a simplification, history has shown that the concentration of banking assets in large financial centres has persisted over time (discussed more in the following section of this article).
(2) See Barro and Sala-i-Martin (1992) and Mankiw, Romer and Weil (1992). This model also incorporates projections for population growth from the United States Census Bureau.

another in cities and industrial clusters (Glaeser (2010)). The benefits of clustering include higher productivity and wages and a competitive advantage in world trade for industries within the agglomeration (Crafts and Wolf (2013)).

It is plausible that agglomeration benefits have exacerbated the trend towards larger, and more geographically concentrated, international financial centres. As highlighted by the economist Alfred Marshall, writing in the late 19th century, in some industries, companies have a tendency to locate close to one another:

'When an industry has thus chosen a locality for itself, it is likely to stay there long: so great are the advantages which people following the same skilled trade get from near neighbourhood to one another. The mysteries of the trade become no mysteries; but are as it were in the air, and children learn many of them unconsciously.'(1)

In Marshall's day, particularly striking examples of this phenomenon could be seen in UK manufacturing. For example, Lancashire was home to almost 50% of world cotton spindles.(2) More recently, towns and cities in China have become very important suppliers of particular products; to give one example, Qiaotou produces 60% of the world's buttons and up to 80% of its zips.

Such spatial concentration provides evidence that there are gains for firms in some industries from locating near each other. Three factors are thought to explain gains from clustering:

- local access to specialised labour;
- local access to specialised inputs; and
- services and knowledge spillovers.

There is some evidence that finance is characterised by such gains to clustering. Consistent with this view, Kindleberger has documented the tendency for financial activity to concentrate in a few large international financial centres.(3) Others have noted the steep gradation in rents between city centres and suburbs in financial centres (Drennan (1996)), which is evidence that financial firms place a high value on being located close to one another. Out of the three reasons put forward for the existence of clusters, the availability of specialised labour is likely to be particularly relevant to financial hubs. But the availability of other inputs to production (such as legal and accounting services) and knowledge spillovers may also be important.

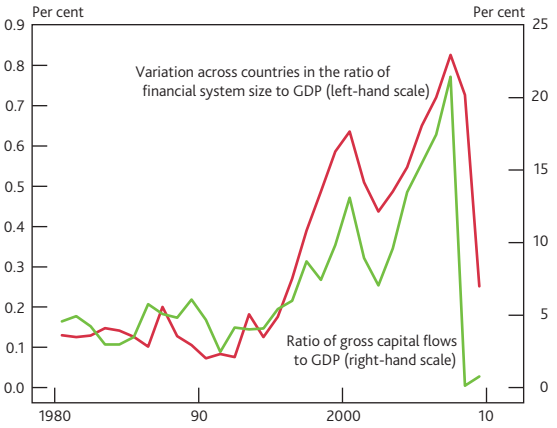
Some theories suggest that the social benefits of clustering are not fully taken into account by individual firms when they are deciding where to locate. This is because they do not consider the benefits to other firms of their location decision. The spillovers which are neglected have been termed 'agglomeration externalities'. These theories tend to suggest that, all else equal, sectors with agglomeration externalities are the right size or may even be too small from a national welfare point of view.(4)

Comparative advantage

But why is there a financial centre in the United Kingdom? One explanation may be that the United Kingdom is able to produce banking services more efficiently than other countries. In other words, it may have a comparative advantage in providing international banking services. The sources of this advantage may include the United Kingdom's central time zone location between the United States and Asia, its openness to trade and capital flows, its language and its robust legal and regulatory structure.

Chart 4 shows some supporting evidence that openness has been an important factor in the growth of financial centres. The green line shows a measure of financial openness — the ratio of gross capital flows to world GDP. The red line shows a measure of the cross-country variation in banking system size relative to GDP. When this line is low, banking systems across the world are similarly sized. But when it is high, some are much larger than others. The chart shows that when financial openness has been high, there has been a tendency for financial activity to cluster in a few large international financial centres and *vice versa*. This is consistent with the fall in UK banking system size relative to GDP since the 2008–09 crisis: over the past four years it has shrunk by 100% of GDP on a residency basis.

Chart 4 Variation in financial system size and gross capital flows(a)



Sources: International Monetary Fund (IMF) *World Economic Outlook* (October 2014) and OECD.

(a) Variation in financial system size is measured as the coefficient of variation of financial sector output shares of GDP. Gross capital flows are shown as a percentage of world GDP. The sample includes all OECD member countries excluding Luxembourg.

(1) See Marshall (1890).
(2) See Crafts and Wolf (2013).
(3) See Kindleberger (1974).
(4) See Baldwin and Krugman (2004) and Norman and Venables (2004) for further analysis of the policy implications of agglomeration externalities.

The origins of London as a pre-eminent financial centre

The rise of a major financial centre is often closely linked to the economic power of the country that hosts it (Cassis (2005)). This was the case with London, which replaced Amsterdam as the world's financial centre at the turn of the 19th century. Britain had built up a dominant position in the world economy during the 18th century, particularly during the industrial revolution in the last third of the century.

Trade encouraged financial development. The number of private banks increased from fewer than 30 in 1750, to 50 in 1770 and to 70 in 1800 and listings of large companies such as the English East India Company spurred the development of a centralised market for shares. The correspondent banking system, in which banks like the Bank of England (established in 1694) had branches in the regions and a head office in the same place, was a force for centralisation. Given its status as the main port, the capital city and the centre of the railway network, 'the system had no choice but London' for the financial centre (Kindleberger (1974)).

The United Kingdom's economic and financial dominance continued in the 19th century, helped by globalisation, industrialisation and war. The United Kingdom provided around 20% of world trade in 1850 and about 25% in the 1860s. The Port of London, the largest in the world, bordered the financial district and was a key factor in explaining London's enduring role as an entrepôt.

Demand for capital from big businesses, including from abroad, led to the further development of financial markets. Railway companies are a good example. In 1853 railway stock representing a nominal capital of £194 million was listed on the London Stock Exchange (LSE) — equivalent to 30% of nominal GDP at that time — and was the second most common type of security after government securities. From 1853–73, the nominal value of the securities on the LSE went from £194 million to £374 million, and that of foreign railway securities (including the British Empire) from £31 million to £354 million. In the early 1870s, issues on behalf of American railways represented around 70% of all the railway issues placed in London.

London and Paris were vying for top spot as the leading global financial centre in the second half of the 19th century. But following France's military defeat against Prussia in 1871, London became the main settling house of exchange transactions in Europe.

'Path dependence'

Comparative advantage is unlikely to be the only reason why the United Kingdom hosts an international financial centre. A particular location for a cluster can become preferred over time, even if there was no clear reason to prefer one location over another before the industry developed. The role of history in shaping current outcomes is sometimes called 'path dependence'.

The pre-eminence of the UK financial system can, in part, be traced back to the rise of London as a financial centre in the 18th and 19th centuries. The box above provides some evidence on London's rise as a financial centre up to the end of the 19th century, attributing it in part to the United Kingdom's dominance in world trade during that period and in part to a dose of luck.

Implicit government subsidy

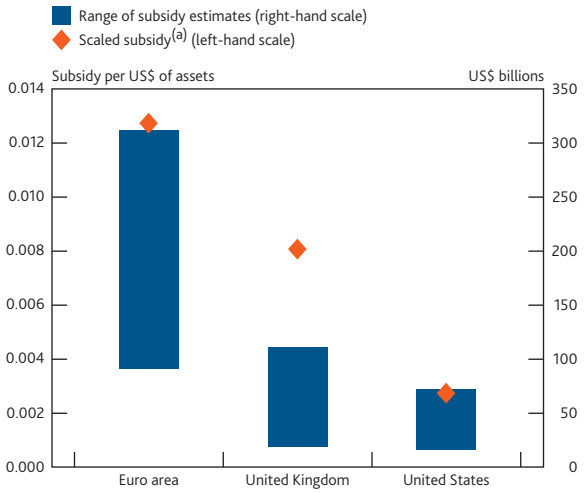
Another possible factor behind the growth in the United Kingdom and other banking systems is that they have benefited from an implicit government subsidy. This is an example of a market friction — something which, according to economic theory, leads to the over or undersupply of a good or service relative to the amount that would be most beneficial for society.

The implicit government subsidy arises because some banks effectively receive insurance from the government without fully paying for it. Specifically, unlike with most other firms, holders of certain banks' debt have historically not faced sufficient risk of loss because they expect the government to prevent banks from failing, as they did in a number of cases in the recent financial crisis. To the extent that banks and creditors do not pay for this guarantee, it can be considered an implicit subsidy (Noss and Sowerbutts (2012)).

Estimates of the extent of the implicit subsidy vary by sample period and the estimation method used, but it is material on most measures. For instance, a study by the IMF (2014) suggests that in 2011–12 the implicit subsidy was in the range of US$20 billion to US$110 billion for major UK banks, US$15 billion to US$70 billion for major US banks, and US$90 billion to US$300 billion for major euro-area banks (**Chart 5**).

To try to make the implicit subsidy estimates more comparable across regions, the orange diamonds on **Chart 5** show a proxy for the subsidy per unit of asset for major banks in each region. This proxy is only a partial picture — for example, it covers only the global systemically important banks (G-SIBs) — but on the face of it, it suggests that the scale of the implicit subsidy in the United Kingdom was no bigger than in the euro area and therefore it is unlikely to explain why the United Kingdom has a much larger banking system as a share of GDP.

Chart 5 Estimates of the implicit subsidy value for G-SIBs in the euro area, the United Kingdom and the United States, 2011–12



Sources: Federal Deposit Insurance Corporation, IMF (2014) and Bank calculations.

(a) Calculated for each region as the mid-point of the range of subsidy estimates shown in the chart divided by the total assets of G-SIBs in that region. US bank assets have been adjusted to make them more consistent with International Financial Reporting Standards.

There is some evidence that implicit (and explicit) government guarantees lead banks to overinvest in risky assets.(1) Microprudential regulation — implemented in the United Kingdom by the Prudential Regulation Authority — aims to mitigate this, in part, by ensuring that banks have sufficient levels of capital and liquidity to reflect the risks that they take. And macroprudential policy — carried out in the United Kingdom by the Financial Policy Committee — aims to ensure the resilience of the financial system as a whole.(2)

Moreover, to the extent that an implicit subsidy results in an oversupply of banking services, there could be a broader misallocation of financial and human capital towards the banking system and away from potentially more productive uses.(3) This is consistent with the finding in some academic studies that an oversized banking system may inhibit economic growth. Specifically, some recent empirical studies have suggested that there is an n-shaped relationship between the ratio of credit to GDP (a measure of the size of the banking system) and economic growth, with the evidence suggesting that countries with credit to GDP ratios above 100% exhibit lower growth (Arcand, Berkes and Panizza (2012)); the United Kingdom currently has a credit to GDP ratio of close to 160%. However, it is not clear how much weight policymakers should put on this result when considering the size of the banking system: the relationship between credit to GDP and economic growth is fairly weak, and the focus of this study is on domestic credit rather than total assets (the latter measure also incorporates banks' foreign activities and wholesale banking operations).

It is also difficult to say to what extent the negative impact on society from the implicit subsidy to banks is offset by other factors. One reason for this is that we have a poor grasp of the quantitative importance of agglomeration externalities and how they interact with other desirable drivers of banking system size discussed in this section. But, looking ahead, there are a range of initiatives in train to end the TBTF problem and associated implicit subsidy, including recent Financial Stability Board (FSB) proposals on ensuring that G-SIBs have adequate loss-absorbing capacity.(4) Indeed, there is some evidence that the subsidy has already been substantially reduced (see Carney (2014)).

The impact of banking system size and growth on financial stability

This section considers the relationship between banking system size and financial stability outcomes, drawing on the experiences of different countries between 2005 and 2012. It focuses on three questions: was banking system size a robust leading indicator of the crisis? Did countries with larger banking systems suffer larger falls in output following the crisis? And were the direct fiscal costs of the crisis larger for countries with larger banking systems?

Establishing empirically whether banking system size is a leading indicator of banking crises is not straightforward. The approach taken here is to use regression analysis to test whether the countries that experienced a systemic banking crisis tended to have larger banking systems (as measured by the ratio of banking system assets to GDP).

Table A shows summary results from two sets of regressions using two measures of financial crises. In the first set (columns (1) and (2)), the dependent variable takes the value 1 if a systemic banking crisis was avoided in the country in question and value 0 if there was a crisis.(5) In the second set (in columns (3) and (4)), the dependent variable is another measure of the health of banking systems in the crisis — the minimum market-based leverage ratio experienced in 2008–09. This ratio is defined as banks' market capitalisation as a share of total assets, so a very low value would typically signal that the bank is close to failure. To obtain this measure for banking systems, this measure is computed for individual banks and then aggregated up to country level.

The results show that countries that avoided systemic banking crises (column (1)) and had higher market-based leverage ratios (column (3)) did tend to have significantly smaller banking systems. The negative relationships are shown by the negative signs and the statistical significance by the stars. So on the

(1) For example, see Marques, Correa and Sapriza (2013) and Gropp, Gruendl and Guettler (2013).
(2) See Farag, Harland and Nixon (2013) and Tucker, Hall and Pattani (2013).
(3) See European Systemic Risk Board (2014).
(4) See FSB (2014) and Gracie, Chennells and Menary (2014).
(5) The data are taken from Laeven and Valencia (2012).

Table A Was banking system size a robust leading indicator of the crisis?[a]

	(1)	(2)	(3)	(4)
Dependent variable	Avoidance of crisis in 2007–08		Market-based leverage ratio	
Estimation method	Logistic		Ordinary least squares	
Bank assets to GDP ratio, 2005	- ***	+	- ***	+
Change in bank credit to GDP ratio, 2004–05		- **		- **
Leverage ratio, 2005		+ **		+ ***

Sources: Capital IQ, IMF *International Financial Statistics*, Laeven and Valencia (2012), *The Banker*, Thomson Reuters Datastream and Bank calculations.

(a) All regressions use data from 47 countries. + and - denote the sign of the coefficient. *, ** and *** denote statistical significance at thresholds of 0.9, 0.95 and 0.99 respectively. The variables are described in greater detail in the main text of the article.

Table B Did countries with larger banking systems suffer larger output or fiscal costs following the crisis?[a]

	(1)	(2)	(3)	(4)
Dependent variable	Post-crisis output performance		Direct fiscal cost	
Estimation method	Logistic		Ordinary least squares	
Bank assets to GDP ratio, 2005	-	-	+ ***	+ ***
Change in bank credit to GDP ratio, 2004–05		- ***		+ ***
Leverage ratio, 2005		-		+

Sources: Capital IQ, IMF *International Financial Statistics*, IMF *World Economic Outlook* (October 2014), *The Banker*, Thomson Reuters Datastream and Bank calculations.

(a) All regressions use data from 47 countries. + and - denote the sign of the coefficient. *, ** and *** denote statistical significance at thresholds of 0.9, 0.95 and 0.99 respectively. The variables are described in greater detail in the main text of the article.

face of these simple bivariate regressions, having a smaller banking system did offer some protection from the crisis.

But this relationship could be misleading if there are determinants of banking crises which are correlated with banking system size. To check for this, regressions (2) and (4) also include two other variables that many have claimed are important determinants of crises — a measure of credit booms and a measure of capital resilience. Credit booms are proxied by the change in the credit to GDP ratio from 2004 to 2005 and the measure of capital resilience is the banking system accounting leverage ratio in 2005. The accounting leverage ratio is the ratio of the accounting (or book) value of common equity to total assets.[1]

When taking into account credit booms and leverage ratios, the relationships between banking system size and our crisis measures disappear: there is no clear statistically significant relationship between banking system size and banking crises identified in columns (2) and (4). **So once credit booms and capital resilience are taken into account, banking system size would not have helped to predict which countries suffered a crisis**.

Even so, it is possible that economies with larger banking systems experienced weaker economic growth following the crisis. To investigate this possibility, columns (1) and (2) in **Table B** use a measure of post-crisis output performance — the difference between average output growth in 2008–12 and in 2000–07. The coefficient on banking system size is not significantly different from zero in these regressions, **so this calls into question the importance of banking system size in explaining countries' post-crisis output performance**.

Finally, columns (3) and (4) investigate the relationship between banking system size and the direct fiscal costs of the crisis, taken from Laeven and Valencia (2012). The main components of direct fiscal costs are the costs of recapitalising banks and purchases of impaired assets (both gross of any recoveries). Liquidity support and asset guarantees are excluded from this measure. In contrast to the results above, there is a positive association between banking system size and the direct fiscal costs of the crisis which does survive inclusion of other variables, suggesting that **banking system size may have raised the direct fiscal costs of a crisis**. In the future, this correlation should disappear if reform measures designed to end the TBTF problem are successful, with taxpayer support for the banking system no longer necessary.

While there are many causes of financial crises and associated costs, **Tables A** and **B** are consistent with claims that countries which experienced credit booms and which had banking systems with lower leverage ratios were more likely to suffer a crisis. Moreover, economies with credit booms suffered more from the crisis, both in terms of output costs and direct fiscal costs.

We can cross-check these findings by looking at the experience of some other (smaller) countries with large banking systems relative to the size of their economies. At the onset of the recent financial crisis, Ireland (which did suffer a banking crisis) and Hong Kong and Singapore (which did not) all had similarly sized banking sectors, relative to their economies, measuring around 600% of GDP. But in the period between 2000 and 2005, Ireland's banking system grew rapidly, roughly doubling in size relative to GDP, whereas the size of the Hong Kong and Singapore banking systems were broadly unchanged. Moreover, Hong Kong and Singapore had better-capitalised banking systems with levels of regulatory capital some 25% higher than in Ireland when compared to risk-weighted assets.

Evidence from the crisis also suggests that the structure of the banking system, for a given size, can matter for financial stability. One aspect of structure is the presence of foreign-owned subsidiaries and branches and the role they

(1) This is calculated in the same way as the market-based leverage ratio except that it uses the accounting value of common equity rather than the market value.

play in providing critical economic functions. As discussed above, this is particularly important for the United Kingdom as the international aspect of the UK banking system is one of its key features. The provision of credit to UK borrowers from foreign branches, including to the UK corporate sector, fell sharply during the crisis and by much more than that from UK-owned banks and foreign-owned subsidiaries. This might reflect the fact that the funding structure of foreign branches is more fragile, and that lending by foreign branches in the United Kingdom was more concentrated in sectors that were more sensitive to the recent domestic economic cycle (such as commercial real estate).(1)

Conclusion

The UK banking sector is big by any standard measure and, should global financial markets expand, it could become much bigger. Against that backdrop, this article has examined a number of issues related to the size and resilience of the UK banking system, including why it is so big and the relationship between banking system size and financial stability.

There are a number of potential reasons why the UK banking system has become so big. These include: benefits to clustering in financial hubs; having a comparative advantage in international banking services; and historical factors. It may also reflect past implicit government subsidies.

Evidence from the recent global financial crisis suggests that bigger banking systems are not associated with lower output growth and that banking system size was not a good predictor of the crisis (after controlling for other factors). On the other hand, larger banking systems may impose higher direct fiscal costs on governments in crises. That said, there are aspects of banking sector size that were not considered in this paper but that might have a bearing on financial stability, such as the possibility that the banking system becomes more opaque and interconnected as it grows in size and the link between banking system size and the rest of the financial system. Moreover, further work is needed to improve our understanding of the drivers of the n-shaped relationship between the ratio of credit to GDP and economic growth and on the quantitative importance of agglomeration externalities in banking.

The importance of the resilience, rather than the size, of a banking system for financial stability is more clear-cut. For example, evidence from regressions and case studies suggests that less resilient banking systems are more likely to suffer a financial crisis. This is, in part, why the Bank of England, in conjunction with other organisations including the FSB, is pursuing a wide-ranging agenda to improve the resilience of the banking system. These policy initiatives will also mitigate some of the undesirable reasons why the UK banking system might be so big, for example, by eliminating banks' TBTF status and implicit subsidy.

(1) See Hoggarth, Hooley and Korniyenko (2013).

References

Arcand, J-L, Berkes, E and Panizza, U (2012), 'Too much finance?', *IMF Working Paper No. 12/161*.

Baldwin, R and Krugman, P (2004), 'Agglomeration, integration and tax harmonization', *European Economic Review*, Vol. 48, No. 1, pages 1–23.

Barro, R J and Sala-i-Martin, X (1992), 'Convergence', *Journal of Political Economy*, Vol. 100, No. 2, pages 223–51.

Carney, M (2013), 'The UK at the heart of a renewed globalisation', available at www.bankofengland.co.uk/publications/Documents/speeches/2013/speech690.pdf.

Carney, M (2014), 'The future of financial reform', available at www.bankofengland.co.uk/publications/Documents/speeches/2014/speech775.pdf.

Cassis, Y (2005), *Capitals of capital: the rise and fall of international financial centres 1780–2009*, Cambridge University Press.

Crafts, N and Wolf, N (2013), 'The location of the UK cotton textiles industry in 1838: a quantitative analysis', *CEPR Discussion Paper No. 9626*.

Drennan, M P (1996), 'The dominance of international finance by London, New York and Tokyo', in Daniels, P W and Lever, W F (eds), *The global economy in transition*, pages 352–71.

European Systemic Risk Board (2014), 'Is Europe overbanked? *Reports of the Advisory Scientific Committee*, No. 4.

Farag, M, Harland, D and Nixon, D (2013), 'Bank capital and liquidity', *Bank of England Quarterly Bulletin*, Vol. 53, No. 3, pages 201–15, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2013/qb130302.pdf.

Financial Stability Board (2014), 'Adequacy of loss-absorbing capacity of global systemically important banks in resolution', consultative document.

Glaeser, E (ed) (2010), *Agglomeration economics*, NBER, University of Chicago Press.

Gracie, A, Chennells, L and Menary, M (2014), 'The Bank of England's approach to resolving failed institutions', *Bank of England Quarterly Bulletin*, Vol. 54, No. 4, pages 409–18, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2014/qb14q404.pdf.

Gropp, R, Gruendl, C and Guettler, A (2013), 'The impact of public guarantees on bank risk-taking: evidence from a natural experiment', *Review of Finance*, Vol. 18, pages 1–32.

Haldane, A (2011), 'The big fish small pond problem', available at www.bankofengland.co.uk/publications/Documents/speeches/2011/speech489.pdf.

Hoggarth, G, Hooley, J and Korniyenko, Y (2013), 'Which way do foreign branches sway? Evidence from the recent UK domestic credit cycle', *Bank of England Financial Stability Paper No. 22*, available at www.bankofengland.co.uk/research/Documents/fspapers/fs_paper22.pdf.

IMF (2014), 'How big is the implicit subsidy for banks considered to important to fail?', Chapter 3 in *Global Financial Stability Report: Moving from liquidity- to growth-driven markets*, April.

Kindleberger, C (1974), 'The formation of financial centers: a study in comparative economic history', *Princeton Studies in International Economics No. 36*.

Laeven, L and Valencia, F (2012), 'Systemic banking crises database: an update', *IMF Working Paper No. 12/163*.

Mankiw, N, Romer, D and Weil, D (1992), 'A contribution to the empirics of economic growth', *Quarterly Journal of Economics*, Vol. 107, No. 2, pages 407–37.

Marques, L B, Correa, R and Sapriza, H (2013), 'International evidence on government support and risk taking in the banking sector', *IMF Working Paper No. 13/94*.

Marshall, A (1890), *Principles of economics*, Macmillan, London.

Norman, V and Venables, A (2004), 'Industrial clusters: equilibrium, welfare and policy', *Economica*, Vol. 71, No. 284, pages 543–58.

Noss, J and Sowerbutts, R (2012), 'The implicit subsidy of banks', *Bank of England Financial Stability Paper No. 15*, available at www.bankofengland.co.uk/research/Documents/fspapers/fs_paper15.pdf.

Tucker, P, Hall, S and Pattani, A (2013), 'Macroprudential policy at the Bank of England', *Bank of England Quarterly Bulletin*, Vol. 53, No. 3, pages 192–200, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2013/qb130301.pdf.

The interaction of the FPC and the MPC

By Tamarah Shakir of the Bank's Macroprudential Strategy Division and Matthew Tong of the Bank's Monetary Assessment and Strategy Division.[1]

- The Bank's Financial Policy Committee (FPC) and Monetary Policy Committee (MPC) are separate committees, each with their own primary objectives, but with a common secondary objective. In addition, the policy actions of one committee can affect economic and financial variables of interest — and hence the policy stance — of the other.
- There are clear benefits from having two separate committees. But there is also considerable scope for, and benefits from, effective information sharing and dialogue between the FPC and MPC, and a shared understanding of each committee's approach to policymaking.

Overview

The recent reforms to the UK system of financial regulation included the establishment of the FPC at the Bank of England as the United Kingdom's macroprudential authority. The FPC has its own set of instruments and a primary responsibility for protecting the resilience of the financial system. It is a separate committee from the Bank's MPC, the United Kingdom's price stability authority, which has a primary objective to meet the 2% CPI inflation target. Both committees share a common secondary objective to support the Government's objectives for growth and employment.

This set-up of two separate committees, with two sets of policy instruments, means that policy tools can be matched effectively to the objectives they are best suited to achieving. And it means that the expertise of the members and discussion within each committee can be focused on those topics most relevant for meeting its objectives.

In addition, housing both committees in one institution and with overlapping membership brings with it a number of clear advantages. It can facilitate effective information sharing between the committees and the ability to form a shared understanding of key economic judgements and each committee's likely policy response. Policy action by one committee may affect economic and financial variables relevant to the policy objectives of the other. For instance, both committees can affect the cost and availability of credit in the economy, with implications for the size and composition of the balance sheets of households, companies and financial institutions.

The actions each committee takes in support of its own objectives will often naturally complement the actions taken by the other in support of its objective. Recently, this has been the case with the policy actions both committees have taken to support the current economic recovery. The actions of the FPC, to build up the resilience of the UK banking system, helped to support the transmission of monetary policy set by the MPC, as it sought to boost economic activity.

In practice, the targeted nature of macroprudential tools means that the FPC's actions to build resilience serve as the natural first line of defence against risks to financial stability, particularly where these are in specific sectors of the economy. But, on occasion, if the FPC's tools are too narrow or potentially inadequate to deal with the scale of the given threat, it may be necessary for monetary policy to act in response to those risks.

Those overlapping channels of transmission mean it will be vital for each committee, when setting policy, to understand and to take into account the likely effects of the other committee's policy actions. In addition to the institutional set-up, this importance of a shared understanding between the committees has been further recognised in the respective remits and recommendations from HM Treasury, and in the approach embodied in the Bank's Strategic Plan.

(1) The authors would like to thank Christopher Jackson for his help in producing this article.

The Bank's Monetary Policy Committee (MPC) and Financial Policy Committee (FPC) have distinct primary objectives — the MPC for monetary stability and the FPC for financial stability — but a shared secondary objective to support the Government's objectives for growth and employment. The policy actions at the disposal of one committee to meet its objectives may often affect economic and financial variables relevant to the other. Furthermore, the overlapping nature of many of the transmission channels for both committees' policy actions means that the interaction between the two can be complex.

Given this scope for cross-cutting effects of monetary policy and macroprudential policy, this article explores the need for the FPC and MPC to interact to ensure each committee's policy actions are consistent with meeting their objectives. It sets out how the institutional set-up of the two committees in the Bank is designed to reflect this scope for interaction. It then goes on to explore in more detail some situations where it may be important for the FPC and MPC to interact closely. Finally, it describes the approach towards committee interaction adopted by the Bank. This connectivity across areas of the Bank and across its policymaking committees is a key principle of the Bank's Strategic Plan.(1)

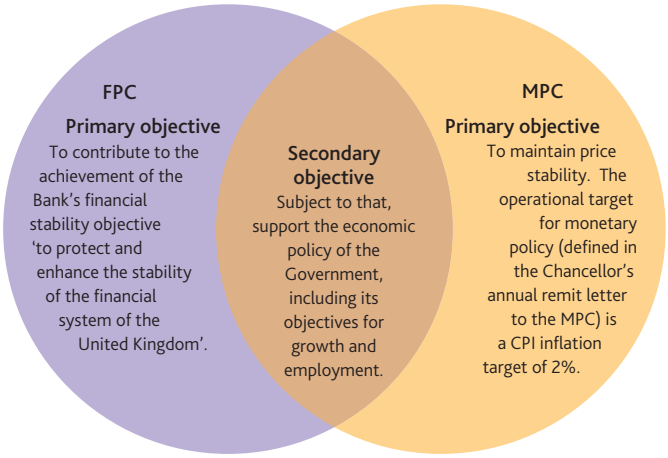
The institutional set-up of the FPC and the MPC

On 1 April 2013, the FPC was established on a statutory basis as the United Kingdom's macroprudential authority, following two years of operating on an interim basis. The FPC has a primary objective to contribute to the achievement of the Bank's financial stability objective '*to protect and enhance the stability of the financial system of the United Kingdom*'. The FPC's responsibility in this regard relates, '*primarily to the identification of, monitoring of, and taking action to remove or reduce, systemic risks with a view to protecting and enhancing the resilience of the UK financial system*'.(2) And it has a set of powers to enable it to achieve this objective. The creation of the FPC fulfils the need — brought into sharp relief by the financial crisis — for a body with the responsibility and the tools to manage risks to overall financial stability, a pre-condition for economic stability and prosperity in the United Kingdom.(3)

The FPC is separate from the Bank's MPC. The MPC's primary objective is to maintain price stability in the medium term, as defined by the Government's CPI inflation target of 2%. In order to meet that objective, the MPC sets Bank Rate. This rate influences other market lending rates, financial asset prices, and the exchange rate, all of which can affect spending and inflation in the economy. The MPC can also directly control the amount of money that the Bank creates by conducting asset purchases, often referred to as 'quantitative easing'.(4)

Subject to achieving their distinct primary objectives, both committees have a shared secondary objective to support the Government's economic policy, including its objectives for growth and employment. This set-up is shown in **Figure 1** and the box on pages 400–01 explains the objectives and tools of the two committees in more detail.

Figure 1 Objectives of the FPC and MPC



This institutional set-up of two separate policy committees that operate in the same institution has a number of potential advantages.

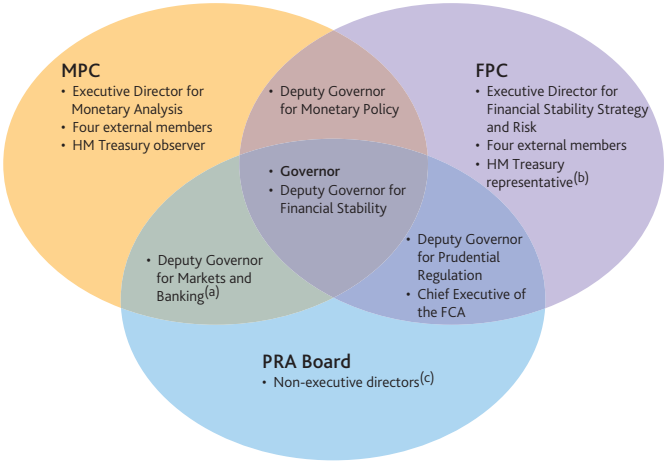
First, this set-up matches policy tools to the objective they are best suited to achieving.(5) It has been argued, for instance, that monetary policy tools are relatively blunt and likely to have more unintended costs than macroprudential tools if targeted at achieving financial stability goals — particularly when it is one particular sector or type of financial activity that is the source of potential instability. In the run-up to the recent financial crisis, for example, very large increases in interest rates would probably have been needed to moderate the increase in credit and asset prices by enough to ensure the resilience of financial institutions.(6) Setting monetary policy instruments to target macroprudential objectives could, therefore, come at a high cost to other objectives, such as price stability and economic output. Equally, macroprudential instruments, as they currently stand, are unlikely to be able to act broadly enough in order to be a sufficient tool to manage short-term changes in economic conditions.

(1) The Bank's Strategic Plan can be found at www.bankofengland.co.uk/about/Documents/pdfs/stratplanback.pdf.
(2) See the Financial Services Act 2012.
(3) See Tucker, Hall and Pattani (2013). The creation of the FPC within the Bank formed part of wider changes to the UK regulatory landscape, which included the creation of the Prudential Regulation Authority (PRA) as a part of the Bank with responsibility for the microprudential regulation of individual deposit-takers, insurers and major investment firms — see Bailey, Breeden and Stevens (2012). The Financial Conduct Authority (FCA) is a separate institution responsible for ensuring that the relevant markets work well; it is the conduct regulator for all financial services firms as well as prudentially regulating all financial services firms not supervised by the PRA (eg asset managers, investment firms, advisors). The FCA also regulates financial services markets and exchanges.
(4) www.bankofengland.co.uk/markets/Documents/money/publications/redbook.pdf. The Bank can also conduct open market operations to control the level of reserves.
(5) See Fisher (2014).
(6) See Bean *et al* (2010).

Second, the distinct primary objectives of each committee provide clarity of purpose. These are helpful in establishing accountability for individual objectives. Furthermore, there is sufficient difference in the focus, time horizons, and type of analysis that would need to be considered to meet each objective that quite different discussions and expertise are likely to be needed in order to make decisions on the appropriate setting for each set of policy instruments. For example, one would expect the FPC to spend significantly more time examining tail risks and interconnectedness in the financial system. In contrast, the MPC is likely to spend more time discussing the most likely outcomes and issues more directly related to the transmission of inflationary pressures, such as wage dynamics in the labour market.(1)

A further advantage of the institutional set-up is the fact that both committees reside under the auspices of the Bank of England, which is operationally independent and accountable to Parliament, and have overlapping membership (**Figure 2**). This set-up supports a high degree of information exchange between the two committees, ensuring that there is a shared understanding of the particular issues and assessments weighing on each committee's policy decisions. It also enables an active dialogue between the two committees in assessing and understanding the impact of policies on both MPC and FPC objectives. Although not the focus of this article, a related feature of the institutional set-up is the overlapping membership of both FPC and MPC with that of the PRA Board, which is responsible for microprudential supervision.

Figure 2 Membership of the FPC, MPC and PRA Board



(a) The Deputy Governor for Markets and Banking also attends FPC meetings.
(b) Non-voting member of the FPC.
(c) The independent members (including the CEO of the FCA) must form a majority of the Board.

Complementarities and trade-offs in FPC and MPC policymaking

Much of the time, the actions that one committee takes in pursuit of its primary objective — whether for price or financial stability — will be complementary to its secondary objective, as well as to the actions and objectives of the other committee. Indeed there may be actions that one committee can take in support of its primary or secondary objectives that allows the other committee to achieve a more favourable trade-off of its objectives.(2) This has been the case for both committees in the policy actions taken to support the current economic recovery — with the FPC's actions to improve capital levels in the UK banking system complementing the MPC's monetary stance.(3) Together, both policies have supported the ability of the UK banking system to provide credit to households and businesses.

On occasion, however, each committee may need to judge how to implement policy decisions in a way that manages any potential trade-off between their respective primary objectives and their shared secondary objective. And sometimes the action taken by one policy committee will affect the primary objective of the other committee.

For instance, the MPC may, in order to prevent inflation falling below target, lower Bank Rate or purchase assets in order to boost aggregate demand. Such an action would be likely to encourage private borrowing and, in some circumstances, that could be associated with an increase in the risks to financial stability, requiring countervailing action by the FPC. Similarly, the FPC may decide to introduce measures that seek to increase the resilience of the financial system, which in some circumstances could cause lending growth to slow. That, in turn, may reduce aggregate demand and lead inflation to fall below the target, prompting the MPC to take action in response.

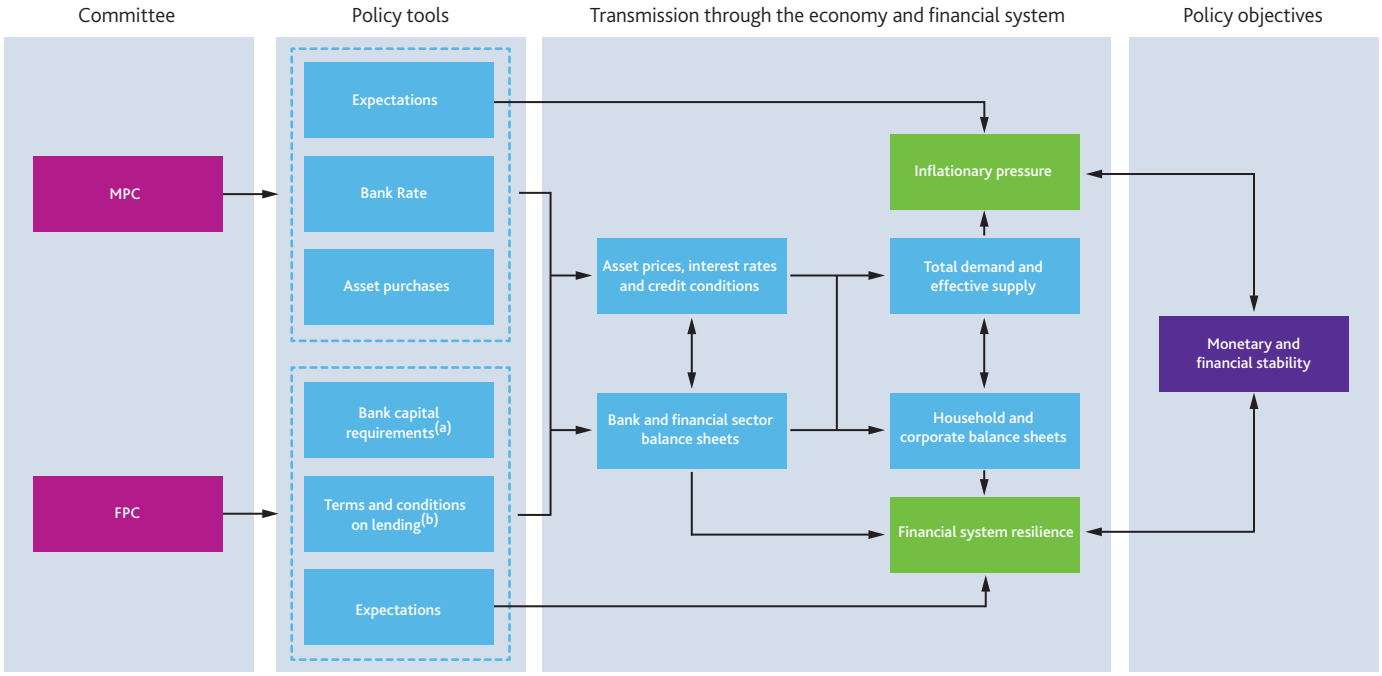
Because of the potential for such spillovers, each committee is required, in its respective remit from HM Treasury, to be clear how it has had regard for the actions of the other in its own policymaking.(4)

Channels of monetary and macroprudential policy interaction

It is clear that, in the past, price instability has contributed to financial crises.(5) The most recent financial crisis, meanwhile, has emphasised that price stability alone is not sufficient to ensure financial stability. Financial crises can both generate large falls in output and impair the transmission of monetary policy.

(1) See Cunliffe (2014).
(2) See, for example, De Paoli and Paustian (2013).
(3) See the Record of the March 2013 FPC meeting, available at www.bankofengland.co.uk/publications/Pages/Records/fpc/2013/record1304.aspx.
(4) See www.gov.uk/government/uploads/system/uploads/attachment_data/file/293733/Letter_from_the_Chancellor_of_the_Exchequer_to_the_Governor_of_the_Bank_of_England_MPC_19032014.pdf and www.gov.uk/government/uploads/system/uploads/attachment_data/file/293985/PU1650_Remit_and_Recommendations_for_FPC__print_.pdf.
(5) See, for example, Schwartz (1995) and Bordo, Dueker and Wheelock (2001).

Figure 3 Selected channels of monetary and macroprudential policy interaction



(a) Includes the countercyclical capital buffer, sectoral capital requirements and the leverage ratio requirement.
(b) Includes limits on lending at high debt to income or loan to value ratios, and could include actions such as Recommendations to vary margin requirements.

One of the principle reasons to anticipate spillover effects from the policy actions of one committee onto the objectives of the other is that both committees' policies will affect the cost and availability of credit in the economy. This transmission through interest rates, credit conditions and asset prices onto economic activity and the balance sheets of households, companies and financial institutions is illustrated in **Figure 3**. And the shared nexus of transmission for both sets of policies means that they could sometimes interact in quite complex ways.

The scope for spillover effects means that, at times, there may be benefits from interaction between the FPC and MPC.(1) Dialogue between the committees can help to form a shared understanding of the likely impact of each committee's policy actions and the relationship between them.(2) The rest of this section discusses how some of these policy spillover effects can arise.

Monetary policy and spillovers to financial stability

Monetary policy decisions by the MPC will affect overall credit and financial conditions and hence may have implications for the FPC (**Figure 3**). By setting Bank Rate, the MPC can influence short-term sterling interbank interest rates. Longer-term interest rates are also closely linked to current and future expected levels of Bank Rate.

This means that changes in Bank Rate, and changes in expectations of the future level of Bank Rate, can affect the interest rates at which companies and households can deposit or borrow from banks, and the prices at which capital market assets — such as equities or bonds — can be issued by companies and the government.(3) Furthermore, asset purchase decisions taken by the MPC will tend to affect the prices of the assets being purchased and those of close substitutes, in addition to sending a signal about the path of future interest rates.(4) As a result, changes in monetary policy will affect the consumption and investment decisions of households and firms, and hence the overall level of aggregate demand for goods and services.(5)

The stance of monetary policy can also have important effects on banks' balance sheets. Banks' sources of funding (including deposits) tend to have a shorter average duration than their lending (their assets). In the short run, therefore, changes in Bank Rate may affect banks' funding costs to a greater degree than the return on their lending, thereby directly affecting profitability. Monetary policy, through its impact on aggregate demand, will also affect the extent of credit losses on banks' balance sheets.

Furthermore, monetary policy may affect balance sheets more generally, through its impact on asset prices, and hence the

(1) This is somewhat different to the co-ordination problem between monetary policy and fiscal policy where the potential for both to affect the business cycle leads to an important role for co-ordination to ensure that medium-term price and public debt stability are met — see Bhundia and O'Donnell (2002).
(2) See Bean (2014).
(3) The current level, and expectations, of Bank Rate and the size of asset purchases are not the only determinants of the cost, terms and quantity of credit available to households and businesses — see Button, Pezzini and Rossiter (2010).
(4) See Joyce *et al* (2012) and Joyce and Tong (2012).
(5) For more details see www.bankofengland.co.uk/publications/Documents/quarterlybulletin/Montrans.pdf.

Objectives and policy tools of the MPC and the FPC

This box sets out a high-level overview of the objectives of the Monetary Policy Committee (MPC) and the Financial Policy Committee (FPC), the tools each committee has at its disposal, and how they meet the requirement to be accountable to Parliament and the wider public.

The MPC

The Bank's monetary policy objective is to deliver price stability — that is, low and stable inflation — and, subject to that, to support the Government's economic objectives, including those for growth and employment. The Bank was given operational independence to set interest rates in order to meet the inflation target over the medium term in the 1998 Bank of England Act. This saw the creation of the MPC, which sets Bank Rate on a monthly basis.

Price stability is defined by the Government's inflation target of 2%, expressed in terms of an annual rate of inflation based on the consumer prices index. The remit recognises the role of price stability in achieving economic stability more generally, and in providing the right conditions for sustainable growth in output and employment.

Monetary policy tools and communication

During normal economic conditions, the main instrument of monetary policy is **Bank Rate**. This policy rate affects short-term market interest rates directly and these, in turn, feed into the interest rates facing households and firms.

In exceptional circumstances, such as when Bank Rate has been lowered to close to its effective lower bound, it may be necessary for the MPC to use additional tools in order to meet the inflation target. This was the experience of the recent crisis when, in March 2009 after Bank Rate had been cut sharply to a historical low of 0.5%, the MPC announced a programme of large-scale asset purchases using central bank money, a policy sometimes referred to as **quantitative easing**.(1)

The MPC's interest rate decisions are announced following each of their meetings, and minutes of the meetings are published to provide greater detail on the material discussed and the range of views. Each quarter, the Bank publishes its *Inflation Report*, which sets out the detailed economic analysis and projections on which the MPC bases its decisions. A press conference is held when the *Inflation Report* is published.

The Bank also publishes other material to increase awareness and understanding of its monetary policy function. For example, in August 2013, the MPC published a document setting out how it views the potential trade-offs between its primary and secondary objectives, and the implications of those for the appropriateness of giving forward guidance on monetary policy.(2)

The FPC

As part of the reforms to the UK regulatory framework that came into force in April 2013, the FPC was established as the United Kingdom's **macroprudential** authority. It has a primary objective to contribute to the achievement of the Bank's financial stability objective 'to protect and enhance the stability of the financial system of the United Kingdom'. In particular, the FPC's responsibility is 'primarily to the identification of, monitoring of and taking action to remove or reduce systemic risk with a view to protecting and enhancing the resilience of the UK financial system'. The FPC is also tasked, subject to meeting its primary objective, with supporting the Government's economic policy, including its objectives for growth and employment.(3)

Macroprudential policy tools and communication

The new legislation gives the FPC two main types of power. First, it can make Recommendations to the microprudential regulators, the Prudential Regulation Authority (PRA) and the Financial Conduct Authority (FCA), to take measures to mitigate risks in relation to any aspect of their regulated entities (but not focused on a specified individual entity). The FPC can also make Recommendations to other bodies, for instance the Financial Reporting Council or financial institutions directly, representative bodies such as the British Bankers' Association, HM Treasury and the Bank of England itself.(4)

The other set of powers that the FPC has is to give Directions to the PRA and FCA to deploy specific macroprudential tools prescribed by HM Treasury. The FPC can currently direct the PRA to use:(5)

- The **countercyclical capital buffer** (CCB), which allows the FPC to change capital requirements above normal microprudential standards in relation to all loans and exposures of banks to borrowers in the United Kingdom.

- **Sectoral capital requirements** (SCR), which are more targeted and allow the FPC to change capital requirements on exposures to three specific sectors judged to pose a risk to the system as a whole: residential property (including mortgages), commercial property and other parts of the financial sector.(6)

The use of these tools can improve the ability of the financial system to withstand shocks. Both the CCB and SCR focus on banks' capital buffers. The more a bank uses capital — such as equity — to finance itself, the more it is able to absorb unexpected losses on its assets, without failing or needing to scale back on new lending.(7)

In November 2013, the Chancellor asked the FPC to consider whether it needs powers of Direction over the leverage ratio, how it would use those additional powers if it were granted them, and how such powers would fit in with the rest of its macroprudential toolkit. On 31 October 2014, the FPC published its final report on the leverage ratio and recommended that the FPC should have a power of Direction to set:(8)

- a minimum leverage ratio requirement applicable to all PRA-regulated banks, building societies and investment firms;
- a supplementary leverage ratio buffer; and
- a time-varying leverage buffer.

The Government proposes to seek legislative approval of these powers of Direction in this Parliament.

The Chancellor of the Exchequer also announced in June 2014 that HM Treasury wanted to grant the FPC additional powers to guard against financial stability risks from the housing market.(9) The Chancellor said that he wanted to secure legislation and have such powers in place before the end of this Parliament. In response to the request from the Chancellor, the FPC recommended in September 2014 that it have the power to direct the PRA and FCA to place limits on residential mortgage lending, both owner-occupied and buy-to-let, by reference to loan to value ratios and debt to income ratios, including interest coverage ratios in respect of buy-to-let lending.(10)

FPC policy decisions, including any new Directions and Recommendations that have been agreed, are communicated to those to whom the action falls — for example, the PRA or FCA. In the first and third quarters of the year, these policy decisions are communicated to the public in a short statement released typically a week after the policy meeting. In the second and fourth quarters of the year, the announcement of those policy decisions forms part of the *Financial Stability Report* (*FSR*). The *FSR* also sets out the FPC's assessment of the outlook for the stability and resilience of the financial sector. A press conference is held when the *FSR* is published. And a formal Record of the policy meeting is published, at present, around a fortnight after the corresponding meeting.

For each of its powers of Direction, the FPC must prepare, publish and maintain a written statement of the general policy that it proposes to follow in relation to the exercise of its powers.

(1) The channels through which asset purchases might affect spending and inflation are discussed in Joyce, Tong and Woods (2011).
(2) See www.bankofengland.co.uk/publications/Documents/inflationreport/2013/ir13augforwardguidance.pdf.
(3) HM Treasury is required to give both the MPC and the FPC written notice each year of the Government's economic policy and must make recommendations about the Committees' responsibilities in relation to their respective primary objectives.
(4) See Tucker, Hall and Pattani (2013).
(5) See www.bankofengland.co.uk/financialstability/Documents/fpc/policystatement140113.pdf.
(6) In addition, SCRs can be adjusted at a more granular level, for example, on mortgages with high loan to value or loan to income ratios at origination.
(7) See Farag, Harland and Nixon (2013).
(8) See www.gov.uk/government/consultations/financial-policy-committees-leverage-ratio-framework.
(9) See www.gov.uk/government/speeches/mansion-house-2014-speech-by-the-chancellor-of-the-exchequer.
(10) See www.bankofengland.co.uk/financialstability/Documents/fpc/statement021014.pdf.

value of collateral that can be used to obtain cheaper secured borrowing.(1) For example, if an easing in monetary policy leads to a rise in property prices then households and businesses who own property may be able to borrow more against that property, and increase their leverage. And, if monetary policy leads to a rise in the value of assets held by banks, then they may be able to use that to obtain funding collateralised against those assets, and increase their leverage.

The MPC's objectives are to deliver low and stable inflation and support sustainable growth. These objectives are likely to be of benefit for financial stability, and are necessary conditions for financial stability to be maintained. Monetary policy, set to achieve these objectives, would, therefore, tend to enhance the profitability of financial intermediation activities and reduce the likelihood of severe recessions that can lead to large losses for banks. This, in turn, should support the efficient allocation of capital in the economy.

But the stance of monetary policy could also have some consequences that give rise to risks to financial stability. First, low levels of interest rates can potentially perpetuate economic and financial imbalances that could, over time, build up to levels that create financial stability risks. As discussed above, an intended consequence of lower interest rates is to stimulate economic activity by easing borrowing constraints, in order for the MPC to meet the inflation target. This can lead to increases in debt relative to incomes. Financial stability can become threatened if overall or sector-specific leverage becomes overly reliant on the monetary stance remaining loose, or on credit conditions in a particular sector continuing to be favourable for an unsustainably long time.

For example, low mortgage interest rates are likely, other things equal, to support activity in the housing market and expectations of house price rises. Low interest rates should also help to boost consumption and encourage new dwellings investment. But if the level of household debt expands rapidly and borrowers take out mortgages that they would be unable to afford if interest rates were to rise, then this could make households more vulnerable to future economic shocks. This may have been the case in some European countries — such as Ireland and Spain — where, in the run-up to joining the euro, interest rates fell significantly. Over the subsequent decade, household credit grew unusually rapidly.(2)

Second, in some circumstances, the stance of monetary policy, combined with the presence of financial market frictions, could lead to a mispricing of risk and a misallocation of lending and capital across the financial system. This, in turn, has the potential to unwind disruptively.

For example, a period of low interest rates that coincides with an environment of unusually low asset price volatility may cause market participants to misperceive the amount of risk in certain investments, or intentionally to take on more risk to compensate for the low level of returns — the so-called 'search for yield'. As a result, financial risk across the system as a whole could become underpriced by investors seeking ever riskier asset classes or more complicated structures, even when they are concerned that valuations may be too high. Eventually, as rates and volatility normalise, this mispricing may correct itself, leading to disruption in financial markets. This, in turn, could have negative consequences for economic activity, particularly if the increased exposure to riskier assets has involved increased leverage. This may have been the case in some countries, such as the United States, in the period immediately prior to the financial crisis.(3)

A key part of the MPC's initial phase of forward guidance was the explicit recognition of the risks to financial stability posed by an extended period of low interest rates and the role that the FPC plays in mitigating those risks. The MPC set a 'knockout' such that their guidance — that Bank Rate and asset purchases would be held at the same level — would cease to hold if the FPC were to judge that the stance of monetary policy 'poses a significant threat to financial stability that cannot be contained by the substantial range of mitigating policy actions available to the FPC, the FCA and the PRA in a way consistent with their objectives'.(4) In this way, macroprudential policy (alongside microprudential regulation) forms the 'front-line' in tackling risks to financial stability.(5) Although forward guidance has now moved beyond that first phase, the FPC continues to monitor the risks from the stance of monetary policy, both domestically and internationally, and could take actions regarding those risks or make Recommendations to the MPC.(6)

Macroprudential policy and spillovers to monetary policy

As explained in the box on pages 400–01, as well as specific powers to direct the PRA and the FCA to adjust specific macroprudential tools, the FPC also has broad powers to make Recommendations. As a result, the range of potential policy actions available to the FPC is large, reflecting the different dimensions of systemic risk that the FPC may need to tackle in order to support the resilience of the financial system.(7) Some types of policy action — for example capital requirements — will tend to achieve their objectives primarily by directly increasing the loss-absorbing capacity of banks' balance sheets. Other policies — such as limits on types of mortgage

(1) See Adrian and Shin (2010).
(2) See Haldane (2014).
(3) See Dell'Ariccia, Laeven and Suarez (2013) and Maddaloni and Peydró (2011).
(4) See www.bankofengland.co.uk/publications/Documents/inflationreport/2013/ir13augforwardguidance.pdf.
(5) See Carney (2013).
(6) Sometimes it may be appropriate for the stance of monetary policy to respond to potential risks to financial stability. See, for example, Woodford (2012).
(7) See Aikman, Haldane and Kapadia (2013).

lending — will tend to operate primarily through restricting the quantity of credit.

An important feature of the FPC's macroprudential policymaking — whether applied to capital, lending or other aspects of resilience — is the ability for tools to be targeted at the sources of the risks to the financial system.(1) For example, if imbalances are building up in particular sectors, the FPC can implement policies, such as lending standards and capital requirements, that are targeted specifically at increasing resilience to risk from those sectors.

The potential spillovers to monetary policy from three key sets of macroprudential prudential tools — capital requirements, liquidity requirements and mortgage lending standards — are discussed below.(2) But, beyond these, there are other potential areas of FPC policy action — such as actions relating to the treatment of collateral in wholesale funding markets, or underwriting standards in corporate credit markets — that could have similar spillovers through their impact on financial market liquidity and credit conditions.

Macroprudential capital requirements

During upswings in economic activity there is a tendency for lenders to increase their exposure to risk, in particular via higher leverage and greater maturity mismatch between their assets and liabilities.(3) This is often followed, in a downswing, by a tendency for excessive risk aversion that can exacerbate the economic cycle.

The FPC could use its powers of Direction or Recommendation to increase the proportion of equity capital banks use to fund lending, thereby increasing their resilience to any increase in losses that could materialise. For example, the FPC could act to increase capital relative to the value of assets on a risk-weighted basis, either by increasing the countercyclical capital buffer or increasing capital requirements on lending to particular sectors. Alternatively, the FPC could act to increase capital relative to measures of total assets, such as the leverage ratio.(4)

Unlike debt funding, a bank has no obligation to repay equity capital funding. So higher amounts of equity funding can enable banks to absorb greater losses. An increase in capital requirements in the upswing would, therefore, work directly to increase the resilience of individual financial institutions in the downswing and, in turn, increase the resilience of the financial system as a whole.(5) And, if in response to higher capital requirements banks act to reduce lending growth and leverage in the economy, that could also indirectly help to improve resilience by making the economy less sensitive to financial shocks.(6)

One determinant of the impact capital requirements have on credit conditions is likely to be through the implied impact on aggregate funding costs. Due to the presence of financial frictions, changes in the composition of a bank's liabilities are likely to lead to changes in their funding costs.(7) On average, an increase in capital requirements would be likely to increase aggregate funding costs facing banks and hence increase lending rates. That tightening in credit conditions may help to slow the expansion of risky lending and, hence, help to stabilise it.(8) But the extent to which this happens is likely to vary over time. On the one hand, in the upswing, bank funding costs may be very insensitive to the composition of funding, which would imply a larger increase in overall funding costs in response to an increase in equity capital. On the other hand, during a downswing, as investors become more concerned about the risks on banks' balance sheets, bank funding costs may increase by much less in response to an increase in capital. Indeed, if investors perceive the bank to be inadequately capitalised, funding costs may actually fall.

There is limited experience globally of varying capital requirements within a macroprudential policy regime, and as a result relatively limited empirical evidence for the impact of these tools on credit conditions. But some recent studies have suggested that an increase in capital ratio requirements has, on average, been associated with a modest tightening in credit conditions.(9)

The impact of these wider effects of macroprudential policy on economic activity would need to be assessed in conjunction with the MPC, who would need to consider whether monetary policy should be adjusted in response.(10) If changes in capital requirements were judged to be leading to downward pressure on inflation, for example, the MPC may want to loosen monetary policy to help support aggregate demand through other channels.

Macroprudential liquidity requirements

The FPC could also recommend changes to regulatory liquidity requirements for banks in order to enhance resilience. Banks'

(1) See Lim *et al* (2011) for a discussion of the different impacts of macroprudential tools.
(2) See Farag, Harland and Nixon (2013) for a primer on the concepts of bank capital and liquidity. For an overview of the role and powers of the FPC in conducting macroprudential policy in the United Kingdom, see Tucker, Hall and Pattani (2013).
(3) See Rajan (1994) and Reinhart and Rogoff (2009).
(4) As explained in the box on pages 400–01, HM Treasury is consulting on granting the FPC powers of Direction over: a minimum leverage ratio requirement; a supplementary leverage ratio buffer for systemically important banks; and a countercyclical leverage ratio buffer.
(5) For more details see www.bankofengland.co.uk/financialstability/Documents/fpc/policystatement140113.pdf.
(6) The FPC may also be able to influence banks' responses through its Recommendations. For example, in the March 2013 FPC Recommendations to the PRA to address capital adequacy in UK banks, they specified that this was to be 'by issuing new capital or restructuring balance sheets in a way that does not hinder lending to the economy'. See www.bankofengland.co.uk/publications/Pages/news/2013/013.aspx.
(7) In particular, it will depend on how much investors' required return on debt and equity issued by banks changes in response to a change in banks' leverage. Or, equivalently, the extent to which the so-called 'Modigliani and Miller Theorem' fails to hold. For more details, see Harimohan and Nelson (2014).
(8) See Tucker, Hall and Pattani (2013).
(9) See Macroeconomic Assessment Group (2010), Aiyar, Calomiris and Wieladek (2012) and Francis and Osborne (2012).
(10) See Kohn (2013).

holdings of liquid assets enable them to meet sudden outflows of funding.(1) But, at the same time, holding liquid assets can represent a cost to banks. So, unless those costs are offset by a reduction in the rates at which banks can obtain market funding, increases in liquidity requirements may also increase the interest rates at which banks are willing to lend and have wider effects on credit conditions.

Changes in liquid asset requirements may also more directly affect the stance of monetary policy. The liquid assets used to meet regulatory requirements include both highly rated bonds, such as gilts, and reserves held at the Bank of England. Changes in Bank Rate and asset purchases by the MPC change the price and quantity of those reserves in the banking system. This, in turn, may affect other yields and asset prices in the economy, and banks are likely to seek to adjust their balance sheets in response to these developments. But changes in regulatory liquidity requirements, and market pressures to hold adequate liquid assets, will affect the demand for liquid assets and banks' balance sheets.

For example, unless banks reduce their lending or other assets, increases in the amount of gilts that banks hold are likely to increase the aggregate amount of deposits held in the banking system, at the same time as reducing the quantity of gilts in the non-bank private sector.(2) In some circumstances, this may be similar to when the MPC makes asset purchases, which create deposits in the banking system and corresponding reserves balances that boost banks' liquid asset holdings.(3)

Macroprudential limits on mortgage lending

The housing market and mortgage debt can pose direct threats to financial stability through lenders' balance sheets and indirect threats through household balance sheets. And a spiral of rising house prices and overextension of credit can act as an amplifier of these risks. While capital tools can be used to address risks from the housing market by directly increasing banking system resilience, policies that place limits on lending can be important complementary tools by acting on the quantity and quality of lending.(4)

The FPC can use its powers of Recommendation to the PRA and FCA to affect the terms and conditions under which banks extend mortgage lending to borrowers. In addition to Recommendations, the Chancellor of the Exchequer has also stated that he intends for HM Treasury to grant the FPC further powers of Direction over mortgage lending.(5) The FPC has recommended to the Chancellor that it should be given powers of Direction to be able to apply limits to the extent of mortgage lending at high loan to value (LTV) ratios and to borrowers with high debt to income (DTI) ratios.(6)

Imposing limits on lending at higher LTV or DTI ratios should directly limit increases in leverage and risk-taking during an upswing in the housing market that can create and amplify financial stability risks over the credit cycle.

By acting to discourage excessive borrowing — either through high LTV or high DTI lending, or through other Recommendations — the FPC may also reduce aggregate lending. This, in turn, may have knock-on implications for wider economic activity and thus affect the MPC's policy decisions. But FPC actions that are aimed at moderating tail risks may have much less of an impact on spending in many states of the world. The FPC's Recommendations on mortgage lending in June 2014, for example, were intended to prevent any further deterioration in underwriting standards, and most lenders were acting within the limits recommended at the time they were announced.

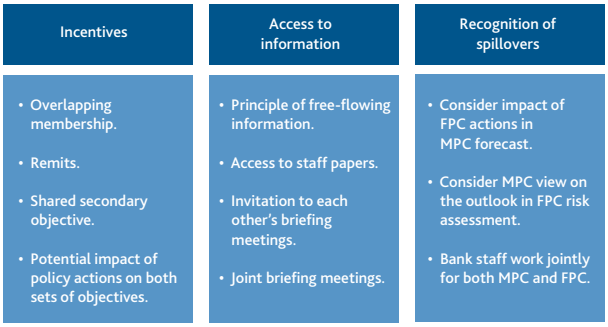
FPC and MPC interaction in practice

As outlined in the previous sections, there are clear benefits from having two separate committees for financial stability and monetary stability. In practice, it allows the FPC and MPC to each focus on the issues and the setting of policy tools that are most relevant for achieving its objectives. But the scope for the policy action of one committee to affect the policy objectives of the other — be that the outlook for financial stability, inflation or their shared secondary objective for growth and employment — introduces a need for interaction between the committees. Indeed, absent the right institutional structures, both committees could act to address an issue that affects both monetary and financial stability in a way that does not take into account the effects of the other's actions. Conversely, one committee might not take action because it erroneously expects the other committee to act or misjudges the impact of the actions.

To try to avoid such problems, the set-up in the Bank of England enables the FPC and MPC to interact and exchange information effectively to ensure their policy approaches are congruent (**Figure 4**). The starting point is that the Governor of the Bank of England is the chair of both committees. Further overlapping attendance in the policy meetings of the FPC and MPC comes from the three Deputy Governors: for Monetary Policy, Financial Stability, and Markets and Banking (**Figure 2**). Their presence in those policy meetings as well as the various briefing, discussion and drafting meetings of both committees ensures an understanding of the key issues one committee is facing in the discussions of the other.

(1) See Farag, Harland and Nixon (2013).
(2) See McLeay, Radia and Thomas (2014).
(3) See Butt *et al* (2012).
(4) See Kuttner and Shim (2013).
(5) See www.gov.uk/government/speeches/mansion-house-2014-speech-by-the-chancellor-of-the-exchequer.
(6) See www.bankofengland.co.uk/financialstability/Documents/fpc/statement021014.pdf.

Figure 4 Pillars of MPC and FPC interaction



There are also a number of other ways in which effective information exchange across both committees is ensured. First, members of both committees have full access to all relevant briefing materials produced by Bank of England staff, for both the MPC and FPC, at the same time. MPC and FPC members also receive direct briefing on the impact of the other committee's policies on their own policy objectives. For example, analysis has been presented to the MPC on the impact of FPC actions on credit conditions and growth and inflation. Meanwhile, the FPC has received briefing on how the low interest rate environment may be affecting financial stability risks.

Second, members of both committees are invited to attend each other's staff briefing meetings. Moreover, the committees have joint briefing sessions on topics of direct common interest in which they can discuss how both monetary policy and macroprudential policy might best respond, and can jointly steer the path for staff analysis and longer-term research.

Third, the Bank aims to ensure that analysis that goes to the committees on areas of common interest is produced jointly by staff across the different areas of the Bank. This encourages a high level of staff interaction and helps to ensure that a wide range of perspectives are presented. Indeed, that collaborative approach to analysis and staff discussion forms a key part of the Bank's Strategic Plan.(1)

In addition to exchanging information, mutual understanding can be enhanced by the committees identifying key policy issues and making clear how they intend to respond when certain shocks hit the economy or financial system. Both the FPC and MPC has taken steps to increase the transparency around their likely policy responses. As described above, the MPC has agreed a policy of forward guidance, setting out clearly the circumstances under which it would consider raising Bank Rate. The FPC, meanwhile, has set out the ways in which it will monitor risks developing in the housing market — which may be directly affected by the current stance of monetary policy — and the appropriateness of the tools at its disposal for dealing with those risks.(2) Furthermore, it has published a policy document setting out its approach to using its Direction tools on bank capital.(3)

There may be times when the policies of the two committees appear to pull in opposite directions.(4) For example, in an environment of slow output growth and weak inflationary pressure, the MPC may loosen monetary policy in order to bring inflation back to target. At the same time, the FPC may judge that it needs to take action to reduce the risk that, in such an environment, lending standards deteriorate and leverage increases. While those two policies may appear to be acting in opposite directions, if the FPC's actions are calibrated only to reduce the risk in those areas of lending that are vulnerable, then both policies together can help to ensure that output growth is supported in a way consistent with the primary objectives of price and financial stability.

In such a situation, the committees may need to consider how to ensure their policies are communicated clearly. This might involve clarifying the respective time horizon over which each committee seeks to achieve its objectives, or explaining how the policy actions are appropriately targeted.

To support wider understanding and accountability for how each committee takes account of the actions and objectives of the other, both seek to explain how they are incorporating the effects of the other committee's policymaking into their own forecasts and decisions.(5) Recently, there have been boxes in both the *Inflation Report*, with the MPC's view on the effects of FPC policy, and in the *Financial Stability Report*, with the FPC's view on the risks from the stance of monetary policy.(6) Committee members also publish research papers and discuss broad cross-committee policy issues in their speeches.(7)

Indeed, the FPC uses the MPC's central projections for macroeconomic variables as the baseline for its own assessment of risks to the financial system stemming from the economic outlook. And the MPC explicitly conditions its forecasts on the policy actions that the FPC has announced. One of the main channels through which this takes place is through adjustments to the MPC's assessment of the cost and

(1) See Carney (2014).
(2) See pages 57–67 of the June 2014 *Financial Stability Report*, available at www.bankofengland.co.uk/publications/Documents/fsr/2014/fsrfull1406.pdf and www.bankofengland.co.uk/financialstability/Documents/fpc/statement021014.pdf.
(3) See www.bankofengland.co.uk/financialstability/Documents/fpc/policystatement140113.pdf.
(4) See Haldane (2014).
(5) In line with their remits from the Chancellor. See www.gov.uk/government/uploads/system/uploads/attachment_data/file/293733/Letter_from_the_Chancellor_of_the_Exchequer_to_the_Governor_of_the_Bank_of_England_MPC_19032014.pdf and www.gov.uk/government/uploads/system/uploads/attachment_data/file/293985/PU1650_Remit_and_Recommendations_for_FPC__print_.pdf.
(6) See pages 16–17 of the May 2013 *Inflation Report*, available at www.bankofengland.co.uk/publications/Documents/inflationreport/2013/ir13may.pdf and pages 52–55 of the June 2013 *Financial Stability Report*, available at www.bankofengland.co.uk/publications/Documents/fsr/2013/fsrfull1306.pdf.
(7) See, for example, Bean (2012), Kohn (2013) and Miles (2010).

availability of credit, and to the impact that changes in the availability of credit have on economic activity and inflation.(1)

Recently, the FPC and MPC have had a series of joint briefings on risks stemming from the housing market. These covered the implications of housing market activity for economic activity more widely, developments in mortgage market conditions, and the risks to the financial system that can stem from those. The MPC and FPC also benefited from a joint approach to briefing and discussion in July and August 2014, when they reviewed developments relating to the referendum on Scottish independence and the associated contingency planning by the Bank.(2)

Conclusion

The creation of a macroprudential authority, the FPC, at the Bank with a set of tools and objectives to protect and enhance the stability of the UK financial system has helped to fill a clear gap in the ability of policymakers to promote economic stability. That those powers and objectives are in a separate committee to the MPC has a number of clear advantages but also raises a number of challenges described in the article.

The Bank aims to overcome those challenges by fostering continuous dialogue between committee members, by ensuring free-flowing information and by ensuring that both committees are transparent in their approaches to incorporating the other's policymaking into their respective assessments.

The ways in which monetary and macroprudential policy have the potential to interact are complex and not yet fully understood. But ensuring a high level of communication and interaction between the committees will help to mitigate the risk that key judgements and policy stances are taken in isolation.

(1) For more details on how staff at the Bank assess the stance of credit conditions see Butt and Pugh (2014).
(2) For more details, see the Record of the FPC's September 2014 meeting, available at www.bankofengland.co.uk/publications/Documents/records/fpc/pdf/2014/record1410.pdf.

References

Adrian, T S and Shin, H S (2010), 'Liquidity and leverage', *Journal of Financial Intermediation*, Vol. 19, No. 3, pages 418–37.

Aikman, D, Haldane, A and Kapadia, S (2013), 'Operationalising a macroprudential regime: goals, tools and open issues', *Banco De España Estabilidad Financiera No. 24*, pages 9–30.

Aiyar, S, Calomiris, C and Wieladek, T (2012), 'Does macropru leak? Evidence from a UK policy experiment', *Bank of England Working Paper No. 445*, available at www.bankofengland.co.uk/research/Documents/workingpapers/2012/wp445.pdf.

Bailey, A, Breeden, S and Stevens, G (2012), 'The Prudential Regulation Authority', *Bank of England Quarterly Bulletin*, Vol. 52, No. 4, pages 354–62, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/qb120405.pdf.

Bean, C (2012), 'Central banking in boom and slump', available at www.bankofengland.co.uk/publications/Documents/speeches/2012/speech617.pdf.

Bean, C (2014), 'The future of monetary policy', available at www.bankofengland.co.uk/publications/Documents/speeches/2014/speech729.pdf.

Bean, C, Paustian, M, Penalver, A and Taylor, T (2010), 'Monetary policy after the fall', Federal Reserve Bank of Kansas City, Jackson Hole Conference.

Bhundia, A and O'Donnell, G (2002), 'UK policy coordination: the importance of institutional design', *Fiscal Studies*, Vol. 23, No. 1, pages 135–64.

Bordo, M D, Dueker, M J and Wheelock, D C (2001), 'Aggregate price shocks and financial stability: the United Kingdom 1796–1999', *Explorations in Economic History*, Vol. 40, No. 2, pages 143–69.

Butt, N, Domit, S, McLeay, M, Thomas, R and Kirkham, L (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, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/qb120402.pdf.

Butt, N and Pugh, A (2014), 'Credit spreads: capturing credit conditions facing households and firms', *Bank of England Quarterly Bulletin*, Vol. 54, No. 2, pages 137–48, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2014/qb14q203.pdf.

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, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/qb100301.pdf.

Carney, M (2013), 'The spirit of the season', available at www.bankofengland.co.uk/publications/Documents/speeches/2013/speech696.pdf.

Carney, M (2014), 'One Mission. One Bank. Promoting the good of the people of the United Kingdom', available at www.bankofengland.co.uk/publications/Documents/speeches/2014/speech715.pdf.

Cunliffe, J (2014), 'The Bank of England's Monetary and Financial Policy Committees: guiding the economy towards a sustainable and safe recovery', available at www.bankofengland.co.uk/publications/Documents/speeches/2014/speech743.pdf.

Dell'Ariccia, G, Laeven, L and Suarez, G (2013), 'Bank leverage and monetary policy's risk-taking channel: evidence from the United States', *IMF Working Paper No. 13/143*.

De Paoli, B and Paustian, M (2013), 'Co-ordinating monetary and macroprudential policies', *Federal Reserve Bank of New York Staff Report No. 653*.

Farag, M, Harland, D and Nixon, D (2013), 'Bank capital and liquidity', *Bank of England Quarterly Bulletin*, Vol. 53, No. 3, pages 201–15, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2013/qb130302.pdf.

Fisher, P (2014), 'Microprudential, macroprudential and monetary policy: conflict, compromise or co-ordination?', available at www.bankofengland.co.uk/publications/Documents/speeches/2014/speech759.pdf.

Francis, W and Osborne, M (2012), 'Capital requirements and bank behaviours in the UK: are there lessons for international capital standards?', *Journal of Banking and Finance*, Vol. 3, No. 3, pages 803–16.

Haldane, A (2014), 'Ambidexterity', available at www.bankofengland.co.uk/publications/Documents/speeches/2014/speech713.pdf.

Harimohan, R and Nelson, B (2014), 'How might macroprudential capital policy affect credit conditions?', *Bank of England Quarterly Bulletin*, Vol. 54, No. 3, pages 287–303, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2014/qb14q303.pdf.

Joyce, M, Miles, D, Scott, A and Vayanos, D (2012), 'Quantitative easing and unconventional monetary policy — an introduction', *Economic Journal*, Vol. 122, No. 564, pages F271–88.

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, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/qb110301.pdf.

Joyce, M and Tong, M (2012), 'QE and the gilt market: a disaggregated analysis', *Economic Journal*, Vol. 122, No. 564, pages F348–84.

Kohn, D (2013), 'The interactions of macroprudential and monetary policies: a view from the Bank of England's Financial Policy Committee', available at www.bankofengland.co.uk/publications/Documents/speeches/2013/speech692.pdf.

Kuttner, K and Shim, I (2013), 'Can non-interest rate policies stabilise housing markets? Evidence from a panel of 57 economies', *Bank for International Settlements Working Paper No. 433*.

Lim, C, Columba, F, Costa, A, Kongsamut, P, Otani, A, Saiyid, M, Wezel, T and Wu, X (2011), 'Macroprudential policy: what instruments and how to use them? Lessons from country experiences', *IMF Working Paper No. 11/238*.

Macroeconomic Assessment Group (2010), *Assessing the macroeconomic impact of the transition to stronger capital and liquidity requirements*, Bank for International Settlements.

Maddaloni, A and Peydró, J (2011), 'Bank risk-taking, securitization, supervision, and low interest rates: evidence from the euro-area and the U.S. lending standards', *Review of Financial Studies*, Vol. 24, No. 6, pages 2,121–65.

McLeay, M, Radia, A and Thomas, R (2014), 'Money creation in the modern economy', *Bank of England Quarterly Bulletin*, Vol. 54, No. 1, pages 14–27, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2014/qb14q102.pdf.

Miles, D (2010), 'Leverage and monetary policy', available at www.bankofengland.co.uk/archive/Documents/historicpubs/speeches/2010/speech451.pdf.

Rajan, R G (1994), 'Why bank credit policies fluctuate: a theory and some evidence', *Quarterly Journal of Economics*, Vol. 109, No. 2, pages 399–441.

Reinhart, C and Rogoff, K (2009), *This time is different: eight centuries of financial folly*, Princeton University Press.

Schwartz, A J (1995), 'Why financial stability depends on price stability', *Economic Affairs*, Autumn, pages 21–25.

Tucker, P, Hall, S and Pattani, A (2013), 'Macroprudential policy at the Bank of England', *Bank of England Quarterly Bulletin*, Vol. 53, No. 3, pages 192–200, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2013/qb130301.pdf.

Woodford, M (2012), 'Inflation targeting and financial stability', *NBER Working Paper No. 17967*.

The Bank of England's approach to resolving failed institutions

By Andrew Gracie, Executive Director, Resolution, and Lucy Chennells and Mark Menary of the Bank's Resolution Directorate.[1]

- The Bank of England has an objective to protect and enhance UK financial stability, as part of which firms must be able to fail without destabilising the rest of the financial system.
- Resolution is the process by which the UK financial authorities can intervene to manage the failure of a firm in an orderly way. The aim is to ensure continuity of the critical economic functions and services provided to customers, and that the costs of failure are borne by shareholders and unsecured creditors rather than taxpayers.

Overview

Since the start of the financial crisis in 2007, there has been a paradigm shift in the approach of the authorities to managing the failure of a bank, building society or investment firm ('firms'). During the crisis, because standard insolvency procedures would have been inadequate, public funds were used to bail out some banks to prevent greater disruption to the financial system and the wider economy. There is now a resolution regime in place that is specifically designed to deal with firm failure in an orderly way.

The Bank of England is the United Kingdom's resolution authority. From January 2015, it will have a set of legal powers that complies with international standards for resolution regimes. This article describes how the Bank expects to use these powers in practice, in order that a firm's critical functions continue to operate without requiring taxpayer bailouts. It is based on *The Bank of England's approach to resolution*, published in October 2014.[2]

Before a firm can be put into resolution it must be failing or likely to fail; and it must not be reasonably likely that recovery action will be taken outside of resolution to reverse that. There are clearly defined roles for the relevant UK authorities. When resolving a firm, the Bank must have regard to the seven statutory objectives of the regime. A number of built-in safeguards provide a degree of protection for depositors, clients, counterparties and creditors.

A set of stabilisation tools may be used if that is deemed necessary in the public interest to meet the objectives. Stabilisation may be achieved by transferring all or part of a firm to a solvent private sector purchaser or a bridge bank, or by carrying out a 'bail-in' to absorb losses and restore solvency using the firm's own resources. Before the failed firm (or its successor) can exit resolution, it may need to be restructured to address the causes of failure and restore confidence.

If the public interest test is not met, firms can be put into a form of insolvency. This ensures that protected depositors are transferred to another deposit-taker or a payout is made to those depositors, and that client assets are returned as soon as is reasonably practicable.

As part of the ongoing regulatory process, the Bank and the relevant prudential supervisor (the Prudential Regulation Authority or Financial Conduct Authority) are developing individual plans for firms within the scope of the regime to ensure that resolution is feasible and credible. The actual tools used will be those that achieve the objectives of resolution at the point of failure.

Firms will be required to make structural and operational changes to ensure that resolution plans can be carried out if that becomes necessary, such as ensuring that there is sufficient loss-absorbing capacity in the right places within firms to allow a bail-in to be successful. Consequently even the largest, most complex firms will be resolvable without the need for taxpayer support and without causing disruption to the financial system or wider economy.

(1) The authors would like to thank Ruth Hite, Jordan Thursby, Eamonn White and Venetia Wingfield for their help in producing this article.
(2) For the full publication, see Bank of England (2014a).

One of the objectives of the Bank of England is to support and enhance the stability of the UK financial system. This is achieved in part by prudential regulation and supervision, which promotes the safety and soundness of firms, among other objectives. However, the regulatory system in the United Kingdom is not designed to ensure that no firm ever fails.

Resolution is the process by which the authorities can intervene to manage the failure of a firm in an orderly way. The Bank is the United Kingdom's resolution authority for banks, building societies, central counterparties and certain investment firms. The Bank seeks to ensure that any of these firms — whether large or small — can fail without causing the type of disruption that the United Kingdom experienced in the recent financial crisis.

If a firm within scope of the resolution regime fails, the Bank will aim to ensure that the adverse effects of that failure are minimised, for example so that:

- access to deposits protected by the Financial Services Compensation Scheme (FSCS) is maintained: around £1.1 trillion of retail deposits are held by individuals,(1) the majority of which are likely to be protected by the FSCS;(2)
- customer payments continue to flow: in the United Kingdom, payments of around £300 billion are transferred each day through banks on behalf of retail and business customers, for example to complete house purchases and to pay salaries and bills;(3)
- credit and other critical functions continue to be provided to the wider economy; and
- the risk of disorderly 'fire sales' of the firm's assets, or termination of its derivatives contracts, is minimised.

The resolution arrangements in the United Kingdom are evolving. This article sets out the key features of the United Kingdom's regime for banks, building societies and certain investment firms (hereafter referred to as 'firms') that will prevail once the EU Bank Recovery and Resolution Directive (BRRD) applies, from 1 January 2015.(4) It is based on *The Bank of England's approach to resolution* that was published by the Bank in October 2014.(5)

The first section of this article outlines the aims of resolution and describes the resolution powers available to the Bank. The second section sets out how the Bank expects to use those powers to carry out the resolution of a failing firm in practice.

The UK framework for resolution

A core feature of a stable financial system is that firms must be able to fail in an orderly way. That is, without excessive disruption to the overall financial system, without avoidable interruption to the critical economic functions that these firms provide,(6) and without exposing taxpayers to losses. This principle underpins the Financial Stability Board's international standard for effective resolution regimes (the Key Attributes), agreed by the G20 leaders in 2011.(7) The arrangements for the resolution of failing firms in the United Kingdom are designed to comply with the Key Attributes.

The need for a robust resolution regime

The need for an effective set of resolution arrangements was made clear during the recent financial crisis. Given the risks to financial stability that would have arisen had some institutions been allowed to fail and enter normal insolvency, it was necessary for the public authorities to intervene to limit the disruption, including by providing public funds to recapitalise some banks (for example, the £45.5 billion of equity capital injected into Royal Bank of Scotland). In effect this meant that the gains from banking activities in the run-up to the crisis accrued to the private sector, but when failures occurred the losses were shared with the public sector (often referred to as a taxpayer bailout).

Robust resolution arrangements seek to ensure that losses arising from failure are borne by the shareholders and unsecured creditors of failed firms (just as they would be for non-financial companies), rather than the general public. This will sharpen incentives for the private sector to find a private sector solution to difficulties within a firm, avoiding the need for resolution altogether.

A credible resolution framework is also critical to ensuring that the risks attached to investing in firms are priced appropriately. Removing the implicit guarantee from the UK government to the largest financial institutions should strengthen incentives for firms to demonstrate to their customers, clients and investors that they are not taking excessive risks.

(1) See Table C1.1: Industrial analysis of monetary financial institutions deposits from UK residents, Bank of England *Bankstats*, October 2014.
(2) The FSCS is the deposit guarantee scheme for the United Kingdom; see www.fscs.org.uk for more details.
(3) Average daily gross value of payments transferred through CHAPS, Bacs and Faster Payments in 2013. For more details, see the annex on page 15, Bank of England (2014b).
(4) The Bank's statutory responsibilities for resolution also extend to central counterparties (CCPs) — these are not covered in this article. For more information about the role of CCPs, see Nixon and Rehlon (2013).
(5) See Bank of England (2014a). Both the publication and this article are a complement to the Code of Practice issued by HM Treasury — see HM Treasury (2010). It is currently being updated to incorporate the transposition of the EU Bank Recovery and Resolution Directive into UK law.
(6) Some examples of these functions are: making and receiving payments; extending credit and taking deposits; clearing and settling financial transactions; other retail and corporate banking; borrowing and lending between financial institutions; market-making in certain securities; and custody services.
(7) See Financial Stability Board (2014) for the latest version of the Key Attributes.

To achieve orderly resolution, the authorities also need feasible and credible resolution strategies for individual firms. The use of resolution powers must not result in unacceptable consequences for the rest of the financial system or the wider economy, which would include not interrupting the critical economic functions of the failing firm during resolution.

Main features of the UK regime

The resolution regime comprises a set of tools that enable a firm to be stabilised ('**stabilisation tools**'), and other tools to assist with winding down parts of the firm that do not need to be maintained. There is also a set of modified insolvency procedures that enable the UK authorities to wind down a firm without compromising public policy objectives such as financial stability.

The stabilisation tools can only be used if it is necessary to do so, having regard to the public interest in achieving the objectives of resolution (known as the '**public interest test**'). These objectives, the roles played by the different authorities in the regime, the nature of the tools and the safeguards in place for their use are set out in more detail below.

There are **seven statutory objectives** to which the Bank must have regard when resolving a firm. They are not ranked in any particular order. These objectives are to:

- ensure the continuity of banking services in the United Kingdom and of critical functions;
- protect and enhance the stability of the financial system of the United Kingdom;
- protect and enhance public confidence in the stability of the financial system of the United Kingdom;
- protect public funds, including by minimising reliance on extraordinary public financial support;
- protect depositors and investors covered by relevant compensation schemes;
- protect, where relevant, client assets; and
- avoid interfering in property rights, in contravention of the European Convention of Human Rights.

The resolution regime aims to ensure that public funds are not put at risk in resolving the failing firm or its successors. The powers and tools are specifically designed to ensure that shareholders and unsecured creditors meet the cost of firm failure. This represents a paradigm shift from the situation that existed during (and prior to) the financial crisis. A taxpayer bailout of a firm should be considered only as a last resort.

Temporary access to public funding may still be needed in some circumstances, for example as a loan to the FSCS to support a transfer or payout of protected deposits. But such funds would be expected to be repaid from recoveries in the insolvency and/or from levies on the industry.

Roles of the authorities

There are clearly defined roles in the regime for each of the relevant UK authorities. In practice, the authorities will need to co-operate closely with each other.

The prudential supervisor, either the Prudential Regulation Authority (PRA)(1) or Financial Conduct Authority (FCA),(2) and the Bank will make the decision to put a firm into the resolution regime, having consulted HM Treasury (HMT). As resolution authority, the Bank decides which resolution tools to use and carries out the resolution, except for temporary public ownership and public equity support, for which HMT is responsible. The FSCS pays out or funds the transfer of deposits protected by the deposit guarantee scheme, up to a limit of £85,000 per person per authorised firm, and may also protect investors for losses up to £50,000.(3)

A Memorandum of Understanding on financial crisis management outlines how HMT, the Bank and the PRA will co-ordinate with each other in the run-up to and during the resolution of a firm.(4)

Where relevant, the Bank will also need to consult with regulatory authorities in other jurisdictions when planning for, and carrying out, a resolution. The orderly resolution of a cross-border firm would require close co-operation between all relevant authorities.

Conditions for triggering resolution

There are two key conditions that must be met before a firm can be put into resolution. The first is that the firm must be failing, or likely to fail. This assessment is made by the firm's prudential supervisor (the PRA or FCA). The second condition is that it must not be reasonably likely that action will be taken — outside of the resolution regime(5) — that will result in the firm no longer failing or being likely to fail. This assessment is made by the Bank as resolution authority.

(1) The PRA is responsible for the prudential regulation of banks, building societies, credit unions, insurers and major investment firms. For more information on the role of the PRA, see Bailey, Breeden and Stevens (2012); and for information on the PRA's approach to banking supervision, see Bank of England (2014c).
(2) The FCA is responsible for ensuring that relevant markets function well; for the conduct regulation of all financial services firms; and for the prudential regulation of those financial services firms not supervised by the PRA. For more information see www.fca.org.uk/about/what.
(3) For more information on the proposed changes to the PRA rules on depositor protection, see Bank of England (2014d).
(4) Available at www.bankofengland.co.uk/about/Documents/mous/moufincrisis.pdf.
(5) For example, actions taken by a firm's management including at the behest of shareholders or the prudential supervisor (such as reduced dividend payments, a liability management exercise or a sale of parts of the business).

The regime permits resolution to occur before a firm is 'balance sheet insolvent'.[1] The conditions for entry into the regime seek to strike a balance between facilitating an orderly resolution before all of the firm's franchise value has been eroded, and avoiding placing a firm into resolution before all realistic options for a private sector solution have been exhausted.

Stabilisation tools

The decision to put a firm into resolution does not directly allow use of all of the resolution tools. The stabilisation tools can only be used if that is necessary with regard to the public interest test. In other words, they may only be used if the statutory resolution objectives are unlikely to be met by placing the failed firm into insolvency.

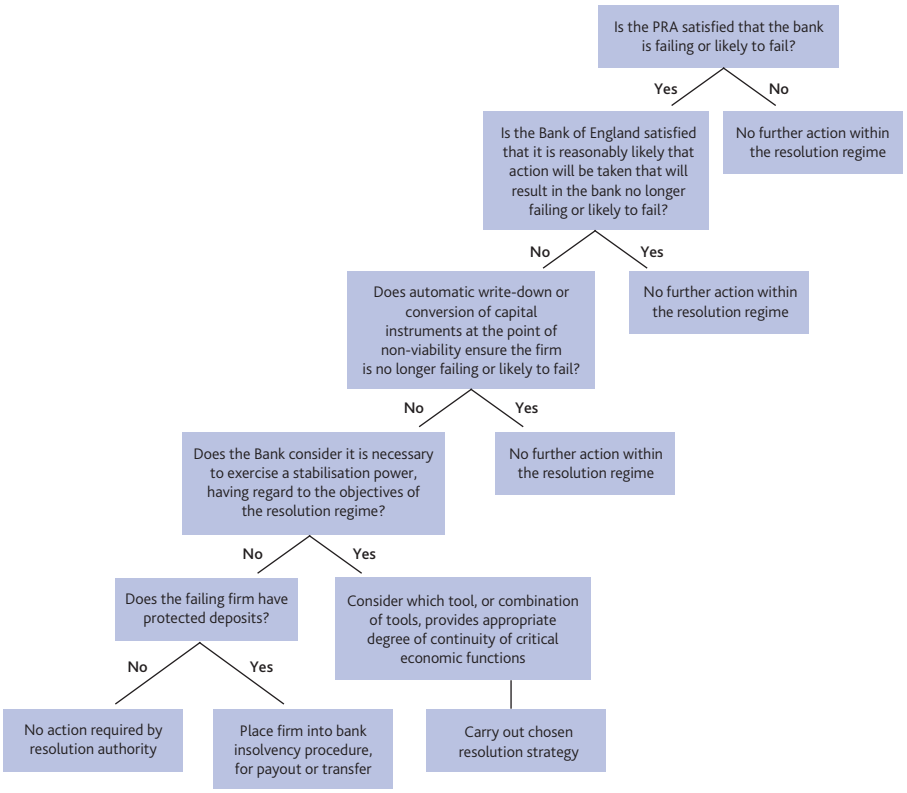
Figure 1 presents a stylised decision tree, setting out the decisions that the PRA as supervisor and the Bank as resolution authority need to make in the course of the resolution of a failing bank. A similar set of decisions would need to be taken in the failure of a building society or investment firm.

If the public interest test is met, the Bank may use one or more of the following stabilisation tools in order to ensure the continuity of critical economic functions:

- to transfer all or part of a firm's business to a willing and appropriately authorised **private sector purchaser**;
- transfer all or part of a firm's business to a **bridge bank** — a wholly-owned subsidiary of the Bank of England — pending a future sale or share issuance;
- carry out a **bail-in** to absorb the losses of a failed firm, and recapitalise it (or its successor) using the firm's own resources. Shareholders and unsecured creditors are written down and/or converted into equity to restore solvency, in a manner that respects the order in which losses would fall in an insolvency.

For those parts of the firm that do not need to be maintained permanently, but may need to be wound down in a measured

Figure 1 Example decision tree for a bank entering resolution[a][b]



(a) Excludes temporary ownership and public equity support, which are to be used only where HM Treasury considers this is necessary to reduce or resolve a serious threat to financial stability, or to protect existing public financial assistance to the firm in question.
(b) For simplicity, assumes the bank has no client assets, and therefore the relevant modified insolvency procedure is the bank insolvency procedure.

(1) The point at which the value of a firm's assets falls below the value of its liabilities. For more information about the risks to banks' balance sheets and their effect on bank capital and liquidity, see Farag, Harland and Nixon (2013).

way, there are two tools that can be used only in conjunction with one or more of the stabilisation tools:

- **asset separation** allows assets and liabilities of the failed firm to be transferred to (and managed by) a separate asset management vehicle, with a view to maximising their value through an eventual sale or orderly wind-down;

- **bank (or building society) administration procedure** places the residual part of a failed firm that is not transferred to a bridge bank or private sector purchaser into administration. The priority of the administrator is to ensure that the residual part continues to provide necessary services (for example IT infrastructure, or mortgage servicing) to the new owner of any transferred business until permanent arrangements for those services can be put in place.

When considering which stabilisation tool (or combination of tools) to use, the Bank must balance the resolution objectives. A box on page 415 provides more information about the choice of resolution strategy and the way in which this interacts with developing firm-specific resolution plans, assessing resolvability and removing barriers to resolution.(1)

If the public interest test is not met, firms may be put into **a modified insolvency procedure**(2) if they hold protected deposits or client assets (or both). An insolvency practitioner will be appointed to manage the wind-down of the firm, with a priority to either transfer protected depositors' accounts to another deposit-taker or to facilitate a payout to those protected depositors by the FSCS. Similarly, an administrator of an investment firm is required to return client money or assets as soon as is reasonably practicable. Where the firm holds neither protected deposits nor client assets, it would be placed into ordinary insolvency.

Safeguards for creditors(3)

The resolution regime provides a number of built-in safeguards for creditors that are designed to provide certainty about how they would be treated in a resolution.

There are protections for financial arrangements where the use of stabilisation tools may otherwise undermine their original purpose (to reduce the counterparty's loss in the event of a default by the firm). These may include: transactions that rely on arrangements to mitigate credit risk faced by counterparties; where collateral has been pledged as security; structured finance arrangements (such as securitisations and covered bonds); and certain other capital and financial market arrangements (such as the rules within investment exchanges and clearing houses).

The regime also requires that no creditor will be left worse off after the use of the resolution powers than they would have been had the whole firm been placed into a normal insolvency proceeding. Where there is any shortfall, those creditors will be entitled to compensation.

Conducting a resolution

The three key phases to carrying out a resolution using the stabilisation powers are described below and illustrated in **Figure 2**:

- **stabilisation**, in which the provision of critical economic functions is assured, either through transfer to a solvent third party or through bail-in to recapitalise the failed firm;

- **restructuring**, during which any necessary changes are made to the structure and business model of the whole firm or its constituent parts to address the causes of failure; and

- **exit from resolution**, where the Bank's involvement as resolution authority in the failed firm and any successor firms comes to a close.

The use of stabilisation tools is likely to involve a number of separate transactions that will be carried out by the Bank. These will be similar in effect, and follow similar principles, to existing corporate transactions: for example a business transfer to a willing purchaser is akin to an acquisition. The key difference is that the Bank has the legal power to act without seeking the consent of shareholders, creditors or the existing management of the firm. This is designed to ensure that action can be taken quickly and effectively.

As part of the process of resolution, the Bank will expect to remove the senior management considered responsible for the failure of the firm and appoint new senior management, as necessary, to any continuing parts of the failed firm not transferred directly to a purchaser.

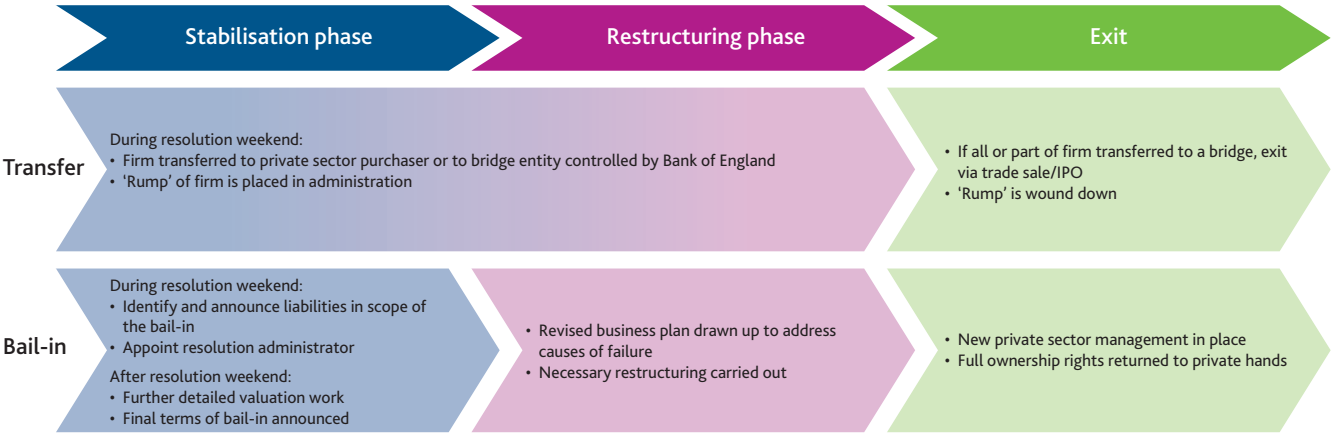
The rest of this section provides more detail on each of the three phases.

Stabilising a firm in resolution

The Bank will decide which of the stabilisation tools — a transfer to a purchaser or bridge bank, or a bail-in — should be used in order to secure the appropriate degree of continuity of a failed firm's critical economic functions. Whichever approach is taken, there will need to be some capacity for the firm's losses to be absorbed at the point of resolution, so that solvency can be restored. It is also likely that the Bank will

(1) For more information on effective resolution strategies, see Box 4 on page 46, Bank of England (2014e).
(2) For protected deposits, the bank insolvency procedure (or the equivalent for a building society) under the Banking Act 2009. For an investment firm holding client assets or client money, the special administration regime, as set out by the Investment Bank Special Administration Regulations 2011.
(3) For more information, see Davies and Dobler (2011).

Figure 2 Stages of resolution



need to provide liquidity to the firm in resolution, for instance if external funding sources are not available to that firm.(1)

As part of the stabilisation of a firm, the Bank will aim to ensure that the firm's existing arrangements for accessing payment systems, clearing and settlement systems and central counterparties remain intact. These are the essential components of the financial market infrastructure. This approach supports the goal of an orderly resolution, by minimising any disruption to existing transactions.(2)

For the more complex resolution cases, it will be advantageous for the authorities to have up to 48 hours outside normal market hours to conduct the initial transactions. This is often referred to as the 'resolution weekend'. It will not always be essential to have an actual weekend — the amount of time required will depend on the extent of advance planning that has been carried out and the speed of the firm's failure. If a firm meets the conditions for entry into the resolution regime mid-week, resolution will begin at that point.

At an appropriate point in the process, such as at the end of the resolution weekend, the Bank will announce:

- the nature of the resolution strategy being carried out: for example a transfer and the destination of the various parts of the business of the firm; or a bail-in and confirmation of the liabilities that will be affected;
- that the firm's core functions will continue without disruption to customers;
- that depositors and investors protected by the FSCS continue to be protected; and
- that the firm will open for business as normal, for example on the Monday morning.

Carrying out a transfer of business(3)

Using one or a combination of the transfer tools, the Bank can take alternative approaches to stabilising the failed firm at the point of failure, depending on the complexity of the firm and the prevailing market conditions.

Where there is a willing purchaser for the whole firm, the firm can be transferred in its entirety to that purchaser. This approach avoids the complexities of maintaining continuity of services when splitting the firm apart in resolution, for example separating deposits that are protected by the FSCS from those to be left behind in administration.

If there is no appropriate purchaser for the whole firm, the Bank can choose to transfer only the liabilities associated with the failed firm's critical economic functions — such as protected deposits — to a purchaser, backed by good-quality assets.

The availability of different transfer options will depend upon a number of factors. For example, the degree of interest from potential purchasers will be determined by the nature of the difficulties at the firm; the ease with which the firm can be valued; and market conditions at the time.

In a transfer of business an acquirer would also need to demonstrate that the acquired or merged business meets the threshold conditions necessary for PRA or FCA authorisation. Such a transfer would generally be effected through an auction process over a 'resolution weekend', unless it were necessary to forgo an auction on financial stability grounds or to complete the transaction speedily. In a transfer of shares

(1) This liquidity may be provided under the terms of the Bank's published schemes, as set out in the Sterling Monetary Framework 'Red Book', see Bank of England (2014f), or on a bilateral individually tailored basis. Any such liquidity provision would need to comply with the European Commission's State aid framework.
(2) For more information about the importance of continuity of payments for customers in a resolution, see Carter (2012).
(3) This can include the transfer of shares or property. For a stylised example of how transfer tools could be used to resolve a failing institution and protect critical economic functions, see Box 2 on page 17, Bank of England (2014a).

Choice of resolution strategy

The choice of resolution strategy emerges from the process of resolution planning. This is conducted by the Bank, working with the PRA and/or the FCA and relevant overseas authorities, based primarily on information provided by the firms. For example, PRA-regulated firms are required to prepare and maintain information on their financial, legal and operational structure, as well as the critical economic functions they perform, and to provide this information to the PRA in the form of resolution planning packs.(1) This information is used by the authorities to identify the preferred resolution strategy, before a firm encounters difficulties. A stylised example of the choice of resolution strategy for a failing bank that is likely to require the use of one or more stabilisation tools — for example bail-in of a holding company, sale to a purchaser, or temporary transfer to a bridge bank and subsequent sale — is set out below.

The choice of strategy will be further informed by a number of additional factors, including the complexity of the firm's balance sheet, the scale of its trading book and the extent of its foreign operations.(2) More detailed resolution planning based on the preferred strategy — with supplementary information provided by the firm — helps to identify any barriers that might prevent the Bank from carrying out the resolution strategy successfully, should that prove necessary.

For global systemically important banks (G-SIBs), resolution strategies are discussed in Crisis Management Groups (CMGs) made up of home and key host financial authorities. The objective of CMGs is to improve preparedness for, and facilitate the resolution of, each G-SIB. In the European Union, as part of the implementation of the BRRD, resolution colleges will aim to facilitate co-operation between home and host resolution authorities for firms that operate in more than one Member State, and provide a forum for joint decisions on resolution planning, assessing resolvability and addressing barriers to resolvability.

The resolution planning that the UK authorities have already carried out, in collaboration with their international colleagues where relevant, have identified a number of common barriers:

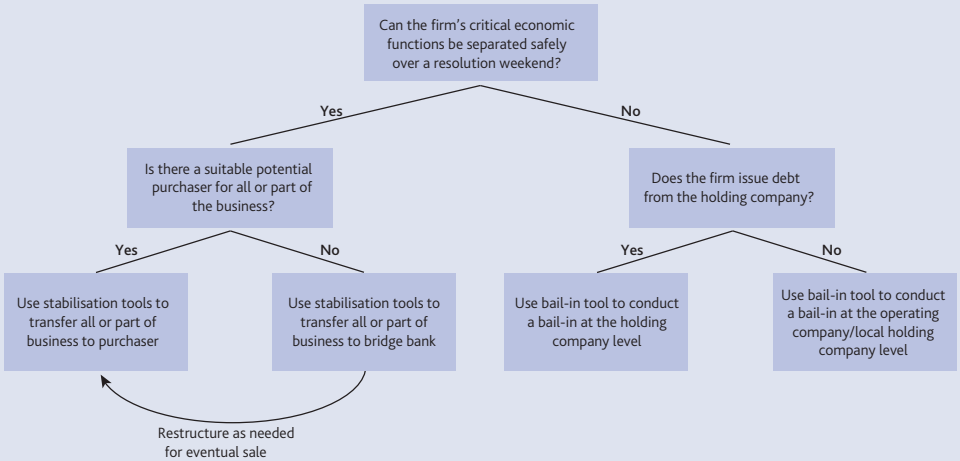
- insufficient loss-absorbing capacity at the holding company and/or operating company;
- the risk of disorderly close-out of contracts governed by foreign law once the firm enters resolution;
- an inability to ensure the supply of services from within the group that support critical economic functions; and
- a lack of flexibility in firms' systems that would affect the authorities' ability to value the firm rapidly.

The Bank will work with firms to ensure that any such barriers are removed, in consultation with the PRA or FCA and other relevant overseas authorities, as required under the BRRD. As barriers are removed, the preferred strategy might be updated to reflect changes in the firm's arrangements for providing essential services to support critical economic functions, or improvements in its arrangements for separating protected deposits from unprotected amounts (and so on).(3)

This extensive preparation before a firm actually encounters difficulties is essential to secure an orderly failure, that is, the appropriate degree of continuity to the firm's critical economic functions. This will increase the likelihood that any disruption is contained, avoiding a risk to financial stability or a loss of confidence in the financial system.

The final choice of resolution strategy is made only at the point that a firm enters resolution. It will be informed by the resolution planning that has previously taken place, up-to-date information on the condition of the firm, and conditions in economic and financial markets at the time.

(1) Details of revisions to the PRA's arrangements for resolution (and recovery) planning are in *PRA Consultation Paper CP13/14*, 'Implementing the Bank Recovery and Resolution Directive', July 2014; www.bankofengland.co.uk/pra/Documents/publications/cp/2014/cp1314.pdf.
(2) For more detail on holding company bail-in strategies for complex firms, see www.bankofengland.co.uk/publications/Documents/news/2012/nr156.pdf.
(3) For example, as a result of *PRA Discussion Paper DP1/14*, 'Ensuring operational continuity in resolution', October 2014 and *PRA Consultation Paper CP20/14*, 'Depositor protection', October 2014, available at www.bankofengland.co.uk/publications/pages/news/2014/125.aspx.



an acquirer would need to seek approval from the PRA or FCA for any change in control.

If a purchaser cannot be found immediately, a bridge bank can be used to maintain the critical economic functions of a failed firm. This should facilitate the future sale of the business to one or more purchasers. It is inherently a temporary measure, and should only operate for as long as is needed to arrange a sale or an initial public offering.

Any part of the firm that is not transferred to a purchaser or bridge bank, such as poor-quality assets and any remaining liabilities that are not linked to critical functions, would be placed into administration or an asset management vehicle.

Carrying out a bail-in(1)

The aim of a bail-in is to stabilise the failed firm and ensure that it can continue to provide critical functions, without any immediate need to split up the firm. This is achieved using the firm's own resources: that is, the interests of existing shareholders are cancelled, diluted or transferred; and the claims of unsecured creditors are written down sufficiently to absorb the losses incurred. Creditor claims are converted into equity to recapitalise the firm.

The main stages of a bail-in transaction within the UK resolution framework are described below.

In the run-up to a resolution, the Bank would create a draft resolution instrument that would give legal effect to the bail-in, including the write-down and/or conversion of outstanding regulatory capital instruments. As part of this preparation, the Bank would identify those liabilities that may be within scope for the bail-in, for example shares, subordinated debt and unsecured senior creditors.

During the resolution weekend, the Bank would confirm which liabilities are included within scope of the bail-in, and the FCA may suspend trading in those instruments. One way of executing the bail-in would be for the Bank to transfer the legal title of the shares to a third-party commercial bank appointed by the Bank to act as a depositary.(2) The Bank is also likely to appoint a resolution administrator, acting under the Bank's direction.

Certificates of entitlement will be issued by the firm to investors holding a liability that is potentially within scope of the bail-in. These represent a potential right to compensation, and provide a mechanism for former creditors to be provided with shares or other instruments in due course. The depositary bank will maintain legal title for these certificates until the final valuation is complete.

During the period immediately after the resolution weekend, further detailed valuation work will be undertaken by the authorities in order to determine the final terms of the write-down of liabilities within scope of the bail-in.(3) Once the valuation work is complete, the final terms of bail-in will be announced, including the terms on which the certificates of entitlement will be exchanged for shares in the firm.

In line with the 'no creditor worse off' safeguard, any shareholders and creditors directly affected by the resolution must not be left worse off than if the whole firm had been placed into insolvency. Creditors may be compensated with shares or other securities in the resolved firm in order to ensure that this safeguard is not breached.

Restructuring the firm

Once the firm has been stabilised, either through bail-in or transfer, the next stage would be to consider what restructuring will be required in order to address the causes and consequences of failure, and restore confidence in the firm.(4)

Any restructuring plan will need to ensure that critical economic functions are maintained. And market confidence will need to be restored in order to maintain relationships with counterparties and to enable the firm to access funding markets at a sustainable price. In the case of a bail-in, the Bank will require a resolution administrator or directors of the firm under resolution to submit a business reorganisation plan. This plan would provide, among other things, a description of the measures aimed at restoring the long-term viability of the firm, and a timetable for carrying out those measures.(5)

The restructuring that takes place after the firm has been stabilised is designed to address the causes of failure. This will take time and is likely to require the firm to have sufficient capital in excess of its minimum regulatory requirements. Therefore, it is essential that the expected costs of restructuring the firm are taken into account when determining the extent of the bail-in that will be required.

With a bridge bank, the restructuring effectively takes place over the resolution weekend, when critical functions are transferred to the bridge bank (such as retail deposits backed with supporting assets).

(1) For a stylised illustration of how bail-in could be used to resolve a failing institution and protect critical economic functions, see Box 3 on page 20, Bank of England (2014a).
(2) A depositary bank would hold the shares on trust until they can be distributed to former bondholders or other creditors identified as being entitled to compensation, once the final terms of the bail-in are announced. This period would need to be as short as possible, while allowing sufficient time to ensure that the valuation, on which write-downs are based, is robust.
(3) See Annex 2 of Bank of England (2014a) for further information about valuations in resolution, including the final asset and liability valuation and the equity valuation.
(4) For example: were the losses caused by a single rogue trader or specific market shock, or did they result from widespread problems with the business model? Did they occur in only one business line or many? Did the circumstances of the failure reveal pervasive problems with the risk management of the firm?
(5) The measures may include: the reorganisation of the activities of the group; a withdrawal from loss-making activities; a sale or transfer of assets or business lines; and a restructuring of existing activities to restore competitiveness.

Exit from resolution

Identifying the route for the Bank to bring its involvement with an individual firm to a close is a key part of the resolution. The regime's tools support the objective that firms will either cease to exist or that they will be restructured and able to operate without official liquidity support when the resolution has been completed.

The precise route out of resolution will be shaped by the nature of the intervention that has taken place. For example:

- where all or part of a business is sold to a private sector purchaser, the exit is clear;
- if a bridge bank is used, it must be a bridge to a more permanent arrangement — exit is likely to be through an onward sale to a private sector purchaser, through a share or portfolio sale, or an initial public offering;
- where the bail-in tool is used to recapitalise an existing firm, it is essential that the causes of the firm's failure are addressed directly in order to restore viability and market confidence in the firm;
- when asset separation is used, this will ensure that certain assets of the firm are dealt with in an orderly fashion;
- where an administration or insolvency procedure is used, this will run its course.

Conclusion

As part of the Bank's objective to protect and enhance financial stability, the Bank aims to ensure that firms are able to fail in an orderly way without causing systemic consequences or critical disruption to economic activity. And firms should not expect financial support from taxpayers. Resolution is the process by which the regulatory authorities can intervene to manage the failure of a firm in an orderly way.

Since the start of the financial crisis in 2007, there has been a paradigm shift in the approach of the authorities to managing the failure of a bank, building society or investment firm. If insolvency is not able to deal effectively with a failure of one of these firms, there needs to be a set of credible arrangements in place so that a failure can be as unremarkable as that of any type of company. Hence the statutory resolution regime focuses on continuing the functions of a failing firm, while imposing the costs of failure on shareholders and unsecured creditors.

This article has set out how the Bank, as the United Kingdom's resolution authority, would expect to use its resolution regime powers and tools in practice. It has explained the purpose and objectives of the regime, its key features, the approach that the Bank would take to resolve a failed firm using its stabilisation tools and the arrangements for safeguarding the rights of depositors, clients, counterparties and creditors. Its purpose is to ensure that all those concerned understand the risks involved — and the protections in place — when a firm fails. The Bank retains the ability to exercise its discretion when deciding how best to resolve a firm in pursuit of the objectives of the resolution regime, based on the facts at the point of failure.

It may be that firms will be required to make structural and operational changes in order to ensure that resolution plans can be carried out. A key element of removing the risk of a taxpayer bailout is to ensure that there is sufficient loss-absorbing capacity in the right places in firms to allow a bail-in to be successful. This work has begun and, once complete, will mean that the risk to taxpayer funds will be significantly reduced even for the failure of the largest and most complex firms.(1)

As approaches to resolution, the legal regime and firm structures evolve, *The Bank of England's approach to resolution* document will be updated.

(1) For more details on progress with the reform of the global financial system, see Carney (2014).

References

Bailey, A, Breeden, S and Stevens, G (2012), 'The Prudential Regulation Authority', *Bank of England Quarterly Bulletin*, Vol. 52, No. 4, pages 354–62, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/qb120405.pdf.

Bank of England (2014a), *The Bank of England's approach to resolution*, October, available at www.bankofengland.co.uk/financialstability/Documents/resolution/apr231014.pdf.

Bank of England (2014b), *The Bank of England's supervision of financial market infrastructures — Annual Report*, March, available at www.bankofengland.co.uk/publications/Documents/fmi/fmiap1403.pdf.

Bank of England (2014c), *The Prudential Regulation Authority's approach to banking supervision*, June, available at www.bankofengland.co.uk/publications/Documents/praapproach/bankingappr1406.pdf.

Bank of England (2014d), 'Depositor protection', *Prudential Regulation Authority Consultation Paper CP20/14*, October, available at www.bankofengland.co.uk/pra/Documents/publications/cp/2014/cp2014.pdf.

Bank of England (2014e), *Financial Stability Report*, June, available at www.bankofengland.co.uk/publications/Documents/fsr/2014/fsr35sec3.pdf.

Bank of England (2014f), *The Bank of England's Sterling Monetary Framework*, available at www.bankofengland.co.uk/markets/Documents/money/publications/redbook.pdf.

Carney, M (2014), 'The future of financial reform', available at www.bankofengland.co.uk/publications/Documents/speeches/2014/speech775.pdf.

Carter, E (2012), 'Considering the continuity of payments for customers in a bank's recovery or resolution', *Bank of England Quarterly Bulletin*, Vol. 52, No. 2, pages 147–53, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/qb120205.pdf.

Davies, G and Dobler, M (2011), 'Bank resolution and safeguarding the creditors left behind', *Bank of England Quarterly Bulletin*, Vol. 51, No. 3, pages 214–24, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/qb110302.pdf.

Farag, M, Harland, D and Nixon, D (2013), 'Bank capital and liquidity', *Bank of England Quarterly Bulletin*, Vol. 53, No. 3, pages 201–15, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2013/qb130302.pdf.

Financial Stability Board (2014), 'Key attributes of effective resolution regimes for financial institutions', October, available at www.financialstabilityboard.org/2014/10/r_141015/.

HM Treasury (2010), *Banking Act 2009 — Special resolution regime: Code of Practice*, November, available at http://webarchive.nationalarchives.gov.uk/+/http://www.hm-treasury.gov.uk/d/bankingact2009_code_of_practice.pdf.

Nixon, D and Rehlon, A (2013), 'Central counterparties: what are they, why do they matter and how does the Bank supervise them?', *Bank of England Quarterly Bulletin*, Vol. 53, No. 2, pages 147–56, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2013/qb130206.pdf.

The potential impact of higher interest rates on the household sector: evidence from the 2014 NMG Consulting survey

By Gareth Anderson of the Bank's Monetary Assessment and Strategy Division, Philip Bunn and Alice Pugh of the Bank's Structural Economic Analysis Division and Arzu Uluc of the Bank's Macro Financial Risk Division.

- This annual article on the latest survey of households carried out by NMG Consulting on behalf of the Bank focuses on the potential impact of higher interest rates.

Key findings from the 2014 survey

The financial position of UK households: an overview[1]

Mortgage debt
£83,000
the average outstanding mortgage

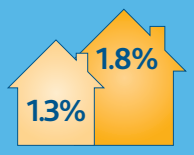
Income
£33,000
average pre-tax annual income

Unsecured debt
£8,000
the average outstanding unsecured debt

If interest rates rose by 2 percentage points...[2]

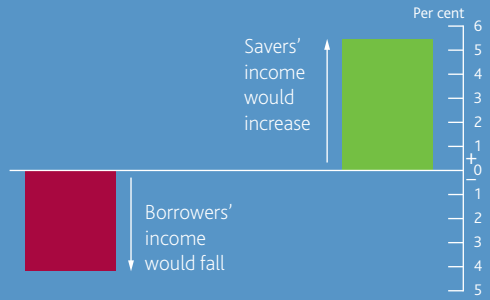
1 Risk of financial distress

...and if the income of all households increased by 10%, the proportion of households with a high mortgage debt-servicing ratio would rise from 1.3% to 1.8% (this proportion would be higher if incomes did not increase, but it would not exceed previous peaks).



2 Redistribution of income

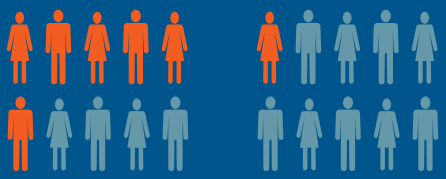
This would result in a redistribution of income from borrowers to savers:



It would also redistribute income:
— from younger to older households
— from higher-income to lower-income households.

3 Impact on spending

The redistribution of income will affect spending decisions:



60% of borrowers would cut spending in response to a rise in interest rates...

...but only 10% of savers would increase spending

Overall, the survey responses imply that a 2 percentage point rise in interest rates could reduce aggregate spending by 1% via this channel.

(1) Mean outstanding mortgage is for mortgagors only. Mean income is for all households. Mean outstanding unsecured debt is for households with unsecured debt only.
(2) In the survey, households were told how much their interest payments/receipts would increase, in pounds, if interest rates rose by 2 percentage points and were asked how they would respond, assuming no change in their incomes. That amount in pounds was calculated using responses for the amount of debt and deposits held from earlier questions in the survey. The increase in interest rates was assumed to be passed through in full. For more details see page 426 onwards in the article. The mortgage debt-servicing ratio is calculated as total mortgage payments (including principal repayments) as a percentage of pre-tax income. A high mortgage debt-servicing ratio is defined as greater than 40%. The spending impacts only relate to the redistribution of income from borrowers to savers and raising interest rates is also likely to affect household spending through other channels.

Introduction

At the time of the August 2014 *Inflation Report*, financial market prices suggested that Bank Rate was expected to start increasing from 2015 Q1. Ahead of any change in interest rates, it is important to understand how the economy will be affected by such a change. The latest household survey carried out for the Bank by NMG Consulting during September therefore focused on assessing the potential impact of higher interest rates on the household sector.

Since August, the growth outlook has weakened a little, and at the time of the November 2014 *Inflation Report*, financial markets were suggesting that Bank Rate was not expected to start increasing until late 2015. As the economy normalises, Bank Rate will eventually need to start to rise in order to achieve the inflation target. But, as noted in the November *Inflation Report*, when Bank Rate does begin to rise, the pace of rate increases is likely to be gradual, with Bank Rate probably remaining below its historical average level for some time. The Monetary Policy Committee (MPC) has no pre-set course for the level of Bank Rate, and the timing of such increases will be determined by the data.

Assessing the current state of households' finances and the possible impact of rising interest rates is important for both monetary and financial stability. From a monetary policy perspective, it is important to understand how aggregate spending in the economy will be affected by higher interest rates. Raising interest rates typically leads to lower household spending, although the extent to which it falls is more uncertain and may change over time. From a financial stability viewpoint, if increases in interest rates were to result in a widespread increase in financial distress on mortgage lending or other debts, that could adversely affect banks' capital positions. And large falls in aggregate spending can also have knock-on effects for the rest of the economy that pose a serious risk to financial stability. The box on pages 422–23 contains a more detailed discussion of the channels through which higher household interest rates might affect both monetary and financial stability and the overlaps between the two.

Aggregate data can provide only a limited assessment of the implications of higher interest rates. It is important to use data at the household level — often referred to as microdata — to assess how many households are particularly vulnerable to rises in interest rates and, more generally, to assess how responses might vary between households in different financial positions.

Between 3 and 24 September 2014, NMG Consulting carried out an online survey of around 6,000 UK households on behalf of the Bank. The Bank has commissioned NMG Consulting to conduct a household survey during September every year since 2004. This year, for the first time, an additional survey of 6,000 households was carried out during April, although the main focus of this article is on the most recent survey.(1)

As in previous years, the latest NMG survey asked households a range of questions about their incomes, balance sheets and the influences on their spending decisions. But in addition, there were a number of new questions asking households how they would respond to higher interest rates.(2) The box on pages 424–25 provides more details on the survey methodology.

This article is structured as follows. It starts by summarising the latest data on the distribution of household debt and debt-servicing costs. Next, it investigates the impact of a rise in interest rates on households, both in terms of assessing the number of households who would have high levels of debt-servicing costs and be at greatest risk of falling into arrears, and in terms of the impact on overall household spending. Finally, it looks at the distributional impacts of raising interest rates.

Recent developments in households' balance sheets

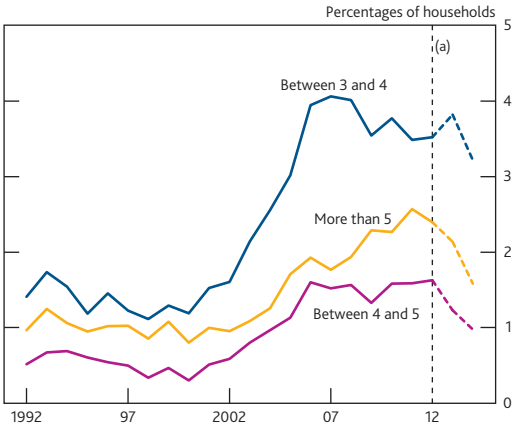
The impact of raising interest rates will depend on households' holdings of debt and savings. National Accounts data show that the aggregate household debt to income ratio has fallen back from its peak in 2009 Q1, although it remains at a relatively high level (see **Chart A** in the box on pages 422–23). That fall reflects increases in nominal income, with the stock of debt having increased very modestly. But as is discussed in more detail in the box on pages 422–23, debt is not unusually high relative to deposits as the aggregate deposit to income ratio is also at a historically high level.

Aggregate data show that the stock of mortgage debt increased only slightly in the year to 2014 Q2. The latest NMG survey suggests that the size of the average outstanding mortgage was broadly unchanged over the year to September and stands at around £83,000.(3) For those with unsecured debt, the average amount of debt outstanding was reported to have increased a little over the past year, to around £8,000. Households also reported modest increases in income relative to the 2013 survey: in the latest survey average annual income before tax was around £33,000, although it was somewhat higher for mortgagors at around £43,000.

(1) Pages 25–27 of the June 2014 *Financial Stability Report* contains some discussion of the results from the April 2014 NMG survey.
(2) The latest survey also included a module on buy-to-let investments, which is not covered in this article. These data, along with the other data from the survey are available on the Bank's website at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2014/nmgsurvey2014.xls.
(3) The averages in this section are based on financial values reported as point estimates in the 2014 survey. Until 2013, respondents were asked which debt/income band they fell into and averages were calculated using the mid-point of each band. Therefore where changes relative to 2013 are reported, these are calculated using the banded data. See the box on pages 424–25 for further details.

The share of households with a mortgage debt to income ratio above 3 is estimated to have fallen back since 2012 (**Chart 1**). That proportion appears to be slightly lower than in 2007, at the start of the financial crisis, although the share is still high relative to the 1990s and early 2000s. Part of the decline in the share of households with high mortgage debt to income ratios reflects a fall in the share of households with a mortgage.[1][2]

Chart 1 Distribution of mortgage debt to income ratios



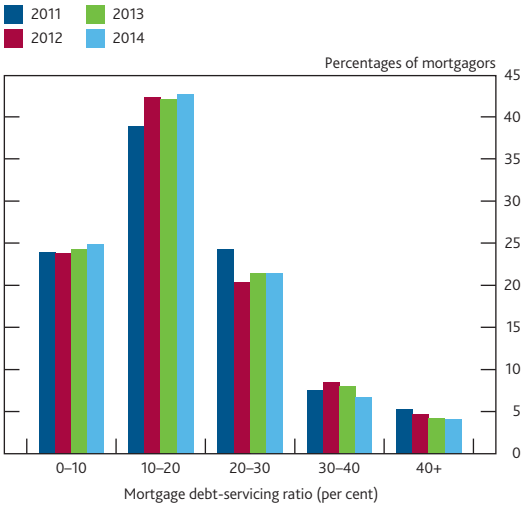
Sources: Living Costs and Food (LCF) Survey, NMG Consulting survey and Bank calculations.

(a) Data up to 2012 are based on responses to the LCF Survey. Data for 2013 and 2014 are based on responses to the NMG survey and have been spliced onto the earlier LCF Survey data series. 2014 NMG data are from the H2 survey only.

In addition to the size of the loan relative to income, when considering the capacity of indebted households to adjust to increases in interest rates it is also important to consider the size of their current loan repayments relative to their income. The sizes of repayments on a loan are determined by the loan size, the maturity of the loan and the interest rate paid on the loan. The debt-servicing ratio (DSR) measures the size of current debt repayments relative to gross income. Households who currently face higher repayments as a share of their gross income — that is, who have a higher DSR — might be considered to be more vulnerable to interest rate increases. While there is no fixed threshold for the DSR at which households become more vulnerable, evidence presented in the box on pages 422–23 suggests that the proportion of mortgagors in arrears increases significantly when mortgage DSRs exceed 40%.

The proportion of mortgagors with high mortgage DSRs was little changed over the past year. **Chart 2** shows that around 4% of mortgagors in the latest survey reported a mortgage DSR of at least 40% — which equates to just over 1% of all households. Households with high mortgage DSRs are much more likely than other mortgagors to report that their income has fallen since they took out their mortgage (**Chart 3**).[3] Some vulnerable mortgagors also have a significant amount of unsecured debt, and more broadly there has been a modest increase in the proportion of households for whom unsecured loan repayments take up a significant proportion of their income.

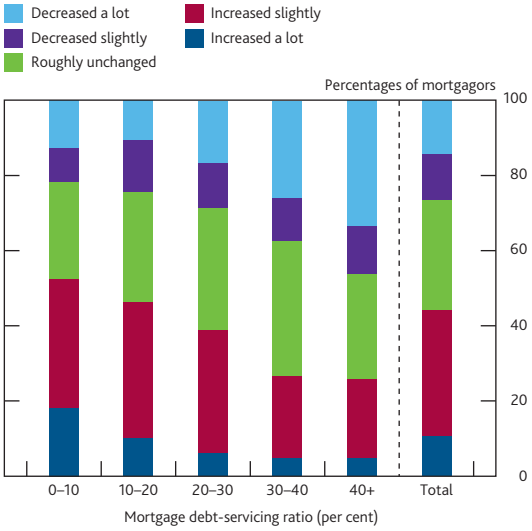
Chart 2 Distribution of mortgage debt-servicing ratios[a]



Sources: NMG Consulting survey and Bank calculations.

(a) The mortgage debt-servicing ratio is calculated as total mortgage payments (including principal repayments) as a percentage of pre-tax income. Calculation excludes those whose DSR exceeds 100%. Reported repayments may not account for endowment mortgage premia. 2014 NMG data are from the H2 survey only.

Chart 3 Change in income since taking out mortgage, by debt-servicing ratio[a]



Sources: NMG Consulting survey and Bank calculations.

(a) Question: 'How does the current annual income of your total household (before deductions) compare with what it was when you last took out a mortgage or secured loan on your main home or changed the amount borrowed on an existing mortgage or loan secured on this property?'. The mortgage debt-servicing ratio is calculated as total mortgage payments (including principal repayments) as a percentage of pre-tax income. Calculation excludes those whose DSR exceeds 100%. Reported repayments may not account for endowment mortgage premia.

(1) According to the English Housing Survey, which is used to weight the NMG survey, the percentage of households with a mortgage has fallen from 39% in 2007 to 33% in 2012–13.
(2) The share of mortgagors with high loan to value (LTV) ratios has also fallen back over the past two years, which in part is likely to reflect increases in house prices over that period. In the latest survey, around 15% of mortgagors had an LTV of 75% or higher.
(3) The most common reason cited by these mortgagors for a decline in their income is that somebody in the household has been made redundant.

Assessing the implications of higher household interest rates for monetary and financial stability

The Bank's Monetary Policy Committee's (MPC's) primary objective is to deliver price stability and meet the 2% CPI inflation target. The Bank's Financial Policy Committee (FPC) is responsible for protecting and enhancing the stability of the UK financial system. Both Committees, however, share a secondary objective to support the Government's objectives for growth. This box describes the main channels through which the impact of higher interest rates on households might have implications for monetary policy and financial stability, and the overlaps between the two.(1)

Implications for monetary policy

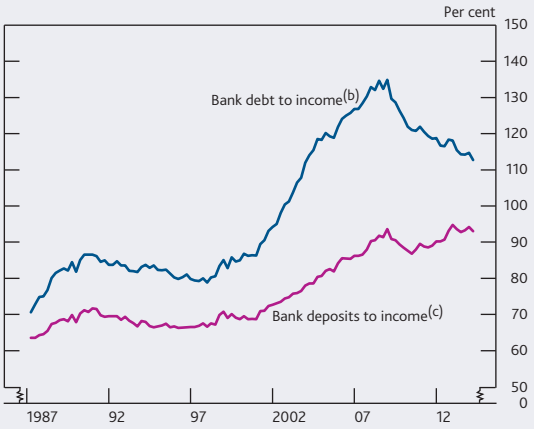
The level of demand relative to supply capacity — in the labour market and elsewhere — is a key influence on domestic inflationary pressure. Understanding the outlook for the level of spending in the economy — around two thirds of which is directly accounted for by households — and how that might be affected by higher interest rates is therefore a key input into monetary policy decisions.

Increases in interest rates should lower household spending: higher rates reduce the disposable income of borrowers by raising interest payments on loans, and boost the income of savers by increasing interest receipts. Borrowers are typically assumed to have higher marginal propensities to consume than savers, implying that borrowers reduce spending by more than savers increase it when interest rates increase, so that aggregate spending falls via these 'cash-flow' effects. But higher rates will also encourage consumption to be postponed because greater returns on saving increase the amount of future consumption that can be achieved by sacrificing a given amount of spending today.

The size of the cash-flow effects on consumption from higher interest rates will depend on the amount of debt held by the household sector relative to its stock of deposits, and on the difference between the marginal propensities to consume of borrowers and savers. Although the household debt to income ratio has risen significantly since the late 1990s (despite the recent fall back), deposits relative to income have also increased, and the ratio of debt to deposits is currently close to its average since 1987 (**Chart A**). The aggregate stock of debt relative to deposits is therefore not likely to be a reason why a given rise in interest rates should have a larger impact on household spending now than in the past. But there is more uncertainty about marginal propensities to consume: estimates from the NMG survey are discussed on page 429.

Increases in financial distress that affect banks' capital positions and which initially pose a risk to financial stability (as discussed in more detail below), may also have monetary policy implications. For example, they might affect the amount and cost of new lending that banks are prepared to undertake, which could then feed back into households' spending decisions and aggregate demand in the economy.

Chart A Household debt to income and deposits to income ratios(a)



Sources: ONS and Bank calculations.

(a) Following methodological changes in the recent *Blue Book*, data used in the calculations are currently only published from 1997. Before 1997, the data are spliced with the previous vintage.
(b) Household financial liabilities with UK monetary financial institutions (MFIs) as a percentage of annualised total household resources.
(c) Deposits with UK MFIs as a percentage of annualised total household resources.

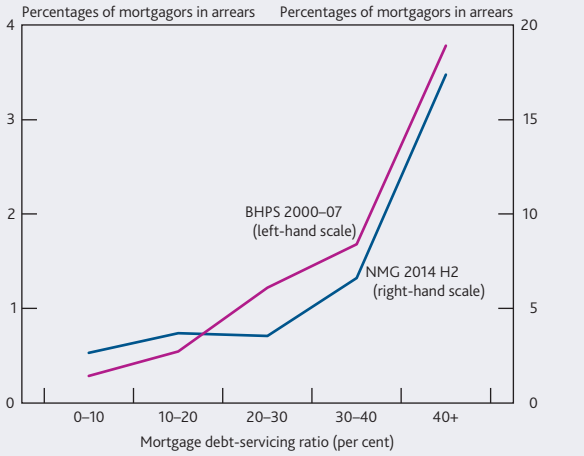
Implications for financial stability

Increases in interest rates can have implications for financial stability through their impact on households' ability to meet their debt commitments. Higher interest rates would raise repayments on both mortgages and other loans, which may increase the number of households struggling to repay their debts. Widespread increases in financial distress have the potential to lower banks' capital positions and threaten the resilience of the UK banking system.

Mortgage lending is the single largest asset class on UK banks' balance sheets. The extent to which the number of households with high debt-servicing costs increases when interest rates rise will be one determinant of how much financial distress rises. There is evidence from both the British Household Panel Survey (BHPS) before the financial crisis and the latest NMG survey that the proportion of mortgagors in arrears increases significantly when mortgage repayments exceed 40% of gross income (**Chart B**).(2) Estimates of how many households fall into this category are discussed on page 427. However, any threshold chosen to proxy a 'vulnerable' household is somewhat arbitrary; developments in income as well as interest rates will affect debt-servicing ratios (DSRs); and DSRs are not the only factor affecting whether households enter arrears.

Large falls in aggregate spending can potentially pose a significant threat to financial stability as well as affecting

Chart B Mortgage arrears and debt-servicing ratios[a]



Sources: British Household Panel Survey (BHPS), NMG Consulting survey and Bank calculations.

(a) In both surveys households were asked whether they had been in arrears for two months or more over the past year. The mortgage debt-servicing ratio (DSR) is calculated as total mortgage payments (including principal repayments) as a percentage of pre-tax income. Calculation excludes those whose DSR exceeds 100%. Reported repayments may not account for endowment mortgage premia.

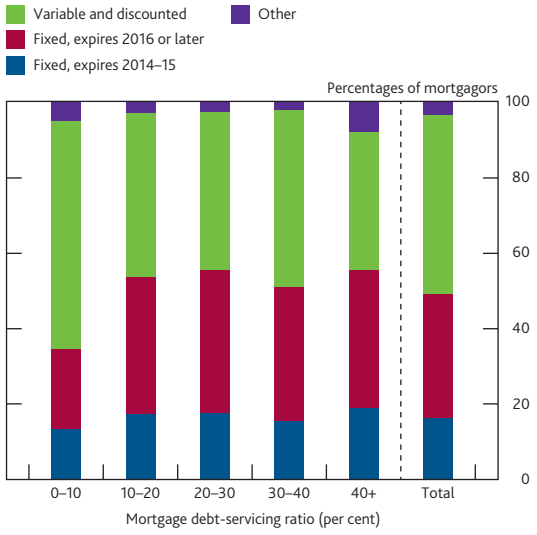
monetary policy. At higher levels of indebtedness, households may be more likely to encounter payment difficulties following negative shocks to income or interest rates. Concerns about the risk of financial distress may lead to sharp falls in spending, even if that distress does not eventually materialise. That could threaten wider economic stability and pose an indirect threat to the resilience of banks, as well as affecting the outlook for inflation.

The potential for household indebtedness to have a large adverse impact on aggregate demand and on the banking system was a key reason why the FPC took policy actions in June 2014 to insure against the risks from a further significant increase in the number of highly indebted households.(3) The importance of this channel will depend on the nature of the shock. A scenario in which interest rates are raised in a gradual and limited way alongside increases in household income is less likely to be one in which indebted households make large cuts in spending that pose a significant risk to financial stability.

(1) See Shakir and Tong (2014) on pages 396–408 in this *Bulletin* for a more detailed discussion on the interactions between the FPC and MPC.
(2) The reported level of mortgage arrears in the latest NMG survey is significantly higher than in the BHPS before the crisis. That partly reflects the fact that aggregate arrears have risen. But also, importantly, the latest NMG survey was conducted online rather than face-to-face like the BHPS, and households appear much more likely to report financial difficulties in online surveys (see Bunn *et al* (2012) for more details).
(3) See the June 2014 *Financial Stability Report* for more detail on these measures; www.bankofengland.co.uk/publications/Documents/fsr/2014/fsrfull1406.pdf.

Households on fixed-rate mortgages are more insulated from the impact of rises in Bank Rate in the short term, since their mortgage repayments would not immediately increase. But the survey suggests that the more vulnerable households with high DSRs are not much more likely than average to be on fixed-rate mortgages (**Chart 4**).

Chart 4 Type of mortgage by debt-servicing ratio[a]



Sources: NMG Consulting survey and Bank calculations.

(a) Question: 'What is the type of interest rate being paid on the mortgage or loan?'. The mortgage debt-servicing ratio is calculated as total mortgage payments (including principal repayments) as a percentage of pre-tax income. Calculation excludes those whose DSR exceeds 100%. Reported repayments may not account for endowment mortgage premia.

Debt burdens and concerns

As well as asking households about the level of debt that they hold and their repayments, the NMG survey asks whether they are finding their debt obligations to be a burden. Encouragingly, the proportion of mortgagors reporting that they are having problems paying for their accommodation has fallen from 19% in September 2013 to 14% in September 2014 (**Chart 5**). Many households that are not facing immediate financial problems may, nevertheless, be concerned about their debts more broadly. In the latest survey, the proportion of mortgagors who reported that they are concerned about their debt remained substantial at around 44%, although this proportion has fallen back in recent years (**Chart 5**).

Renters also reported that the burden of debt — in their cases unsecured debts such as personal loans or credit card debts — has fallen over the past year. 15% of all renters reported that they were finding unsecured debt to be a heavy burden, compared with 19% a year ago.

In the latest survey, around a quarter of mortgagors reported that they had cut spending as a result of concerns about their debt (**Table A**). This proportion has fallen over the past two years. Households with high mortgage DSRs, however, are more likely to have cut spending in response to concerns about debt: around 40% of households who had a mortgage DSR of at least 30% reported that they had cut spending in

Survey method

Introduction and methodology

The latest NMG survey was carried out online over the period between 3 and 24 September, covering around 6,000 UK households.(1) Between 2004 and 2013, the NMG survey was conducted on an annual basis, however, this year an additional survey was undertaken in April, with some of the results presented in the June 2014 *Financial Stability Report*. That survey also covered around 6,000 households. The focus of this article is on the more recent September survey.

The NMG survey includes a panel element, since respondents from previous surveys are invited to retake the survey. Using the same sample allows changes in households' responses to be tracked without the influence of sampling. In the latest survey, respondents to the April 2014 and September 2013 surveys were reinvited. Around half of the households who undertook the latest survey had completed at least one previous NMG survey. However, this article focuses on the cross-sectional data, given that many of the new questions on the impact of higher interest rates are only available in the latest survey.

The survey is weighted to be representative of the population of Great Britain. It is, however, possible that these survey data do not present a true picture of households' finances. That may be because certain types of individuals are more likely to respond to online surveys, or that answers given are not accurate. Nevertheless, the survey data do have broadly similar trends to the aggregate data and are a good source of information for assessing distributional issues.

Reporting of financial values

In surveys prior to 2013, financial values, such as household income, were reported in ranges, rather than actual amounts. In 2013, a new approach was trialled in which new respondents were asked to enter actual amounts rather than being given a list of ranges to select from. In the April and September 2014 surveys, all respondents were initially asked to provide actual amounts. Households that were unable or unwilling to provide actual amounts were then provided with a list of ranges to choose from.

The point estimates for financial values reported in this article are the actual amounts reported by households. For households who were unable to give actual amounts and instead reported ranges, it is assumed that the actual amounts for those households were at the mid-point of their reported ranges.

Advantages of asking households to provide specific values

There are a number of advantages of asking households to provide actual amounts for financial values, rather than asking them to respond in ranges.

1. Monitoring small changes in financial values

One advantage is that it enables small changes in financial values to be identified. This is particularly useful when exploiting the longitudinal element of the survey. For example, a household whose income increased from £30,000 to £39,000 between the 2013 survey and the latest survey would report an income of £30,000–£39,999 in both surveys if asked to respond using ranges and so that increase in income would not be identified.

2. Avoiding the use of range mid-points

When results were reported in ranges, point estimates were calculated by using the mid-points of the relevant ranges. For example, if a household reported that its income was in the range £30,000–£39,999 it would be assumed that this household had an actual income of £35,000.

This assumption might be reasonable if the households who report in this range have actual incomes that are distributed evenly across the range. But using mid-points would provide biased point estimates if households' actual incomes are clustered around specific points in the ranges. For example, if most households who report that their income is in the range £30,000–£39,999 have an actual income of £30,000, then using the mid-point of £35,000 would overstate household income.

Another problem with using mid-points is that it requires an additional assumption about households who select the highest possible range. For example, the highest income range households can choose in the survey is '£100,000 or more'. To assign a mid-point to this range, an arbitrary assumption has to be made about what the average income of households in that group is likely to be.

3. Calculating ratios

The problems with using mid-points of ranges to calculate point estimates can be exacerbated when calculating ratios. Consider a household which has an outstanding mortgage of £165,000 and an income of £30,000. The household's actual mortgage debt to income ratio is given by:

£165,000/£30,000 = 5.5

If the household was answering in ranges in the NMG survey, it would report mortgage debt in the range £150,000–£169,999 and income in the range £30,000–£39,999. Using the mid-points of these ranges would suggest a mortgage debt to income ratio of:

£160,000/£35,000 = 4.6

In this example, using mid-points substantially understates the mortgage debt to income ratio, since mortgage debt is understated and income is overstated.

The treatment of outliers

Asking households to provide actual values for certain financial variables can result in some households reporting extremely large values, which might be considered to be outliers and potentially can have very significant effects on sample averages. For the analysis undertaken in this article, the influence of outliers is limited by recoding values which exceed the 99th percentile for each variable to that value.

Comparisons with point estimates from previous surveys

The change in how financial values are reported in the 2014 surveys means that caution is required when comparing point estimates from previous surveys. Households may respond differently when presented with ranges rather than actual values. Furthermore, as discussed above, mid-points of ranges may be biased estimates of actual values if the actual values are not distributed evenly across the ranges.

To illustrate the difficulties this implies for making year-on-year comparisons of survey averages, **Table 1** considers estimates of the average outstanding mortgage debt for those with a mortgage using different approaches. In the latest survey, the average mortgage debt using the new methodology, based on point estimates of financial values, was £82,976. That compares to £86,728 in the 2013 survey, which was calculated using mid-points of the band. At face value, this suggests a 4% fall in the average level of outstanding mortgage debt. But if the actual values used to compute the 2014 estimate are converted to the mid-points of the relevant ranges, to be consistent with the old methodology, average outstanding mortgage debt is broadly unchanged since 2013.

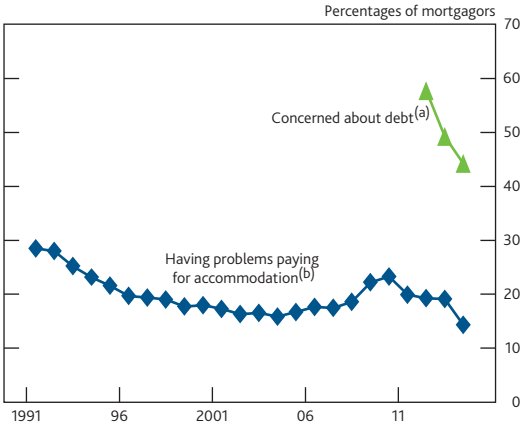
Table 1 Estimates of outstanding mortgage debt

	Old mid-points methodology	New point estimate methodology
September 2013	£86,728	n.a.
September 2014	£86,407	£82,976

Sources: NMG Consulting survey and Bank calculations.

(1) The main survey has been carried out online since 2012. For a discussion of the advantages of conducting the survey online, see Bunn *et al* (2013).

Chart 5 Mortgagors having payment problems and reporting concerns about debt



Sources: British Household Panel Survey (BHPS), NMG Consulting survey and Bank calculations.

(a) Question: 'How concerned are you about your current level of debt?'. Data on mortgage payment problems are spliced with results from the face-to-face NMG survey between 2005 and 2010 and BHPS before 2005. 2014 NMG data are from the H2 survey only. Mortgagors concerned about debt includes those who reported they were either very concerned or somewhat concerned.
(b) Question: 'In the past twelve months, would you say you have had any problems paying for your accommodation?'.

response to debt concerns. This is consistent with other evidence that suggests that heavily indebted UK households cut their spending by more during the recent recession (Bunn and Rostom (2014)).(1)

As well as cutting spending, households facing high debt-servicing costs have responded to concerns about their debt in other ways. In particular, mortgagors who had debt-servicing ratios above 30% were more likely than average to report that they had increased their labour supply in response to debt concerns, both in terms of the number of people in the household who work and the number of hours worked (**Table A**).

Table A How households have responded to concerns about debt(a)(b)

Per cent

	All mortgagors	Mortgage DSR>=30%	All households with debt
Cutting spending	26	40	30
Avoiding further debt	24	33	28
Making overpayments	10	11	11
Working longer hours/taking a second or better paid job	6	11	7
Getting financial help	2	5	3
Taking up employment myself	2	3	3
Someone else taking up employment	1	4	2
Other	2	5	2
No action	3	3	3

Sources: NMG Consulting survey and Bank calculations.

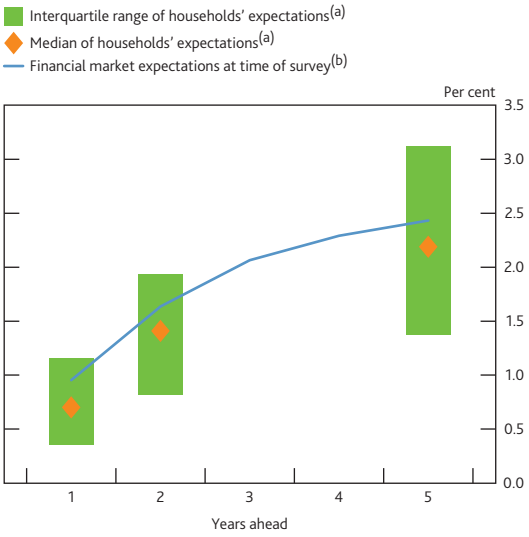
(a) All households were asked 'How concerned are you about your current level of debt?'. Those households who reported that they were either very concerned or somewhat concerned were then asked 'What actions, if any, are you taking to deal with your concerns about your current level of debt?'. Respondents were allowed to select up to three options.
(b) The percentages reported in the table refer to percentages of all households within each group, regardless of whether they were concerned about debt.

The NMG survey also asked households why they were concerned about debt. The most frequently cited reason for such concerns was the possibility of being unable to meet repayments if interest rates rose, with 36% of households reporting this as being a concern, compared with 33% in the 2013 survey. At the time the 2014 survey was taken, households were expecting modest rises in Bank Rate, and

(1) This result is also evident in other countries such as the United States (Mian, Rao and Sufi (2013) and Dynan (2012)) and Denmark (Andersen, Duus and Jensen (2014)).

their expectations were broadly in line with those of financial markets (**Chart 6**).

Chart 6 Expectations for Bank Rate



Sources: Bank of England, Bloomberg, NMG Consulting survey and Bank calculations.

(a) Question: 'The level of interest rates set by the Bank of England (Bank Rate) is currently 0.5%. At what level do you expect that interest rate to be in each of the following time periods? One year from now/two years from now/five years from now?'.
(b) Forward curve estimated using overnight index swap rates over the period from 3 September to 24 September 2014. This is the period over which the survey was conducted. Forward curves constructed in this way are likely to reflect a measure close to the mean expectation of financial market participants.

The impact of higher interest rates

This section investigates the impact of a potential rise in interest rates on households. The first part examines this from a financial stability angle, by estimating the proportion of households that are likely to have high debt-servicing ratios when rates rise, since these households are likely to be the most at risk of entering arrears. The second part uses the survey responses to estimate the extent to which a rise in interest rates is likely to result in a fall in overall household spending.

The analysis in this section is based on a scenario in which Bank Rate rises immediately by 2 percentage points. This increase in rates is assumed to be passed through to households in full, and unless otherwise stated, household income is assumed to remain unchanged. This scenario is therefore likely to be very different to the circumstances in which Bank Rate will actually rise, where increases are likely to be more gradual and accompanied by growth in incomes. Although the aim of this work is to assess the implications of a rise in interest rates that could take place over an extended period, for practical reasons, households were asked how they would respond if the increase in rates took place straightaway. This was in order to avoid them having to make assumptions about how other aspects of their financial situations might change over time.

If Bank Rate were to rise by 2 percentage points, the assumption of full pass-through of higher rates to households is likely be an overestimate. For example, many households hold mortgages and saving products whose interest rates are fixed for a period, and so they would not be immediately affected by a rate rise (although they would be affected over a longer time period, after those contracts come up for renewal).(1) In addition, for simplicity it is assumed that the overall stock of debt remains unchanged; that there is no change in mortgage capital repayments; and that there is no transition between renter and mortgagor status.

Impact of a rise in rates on the proportion of households with high mortgage debt-servicing ratios

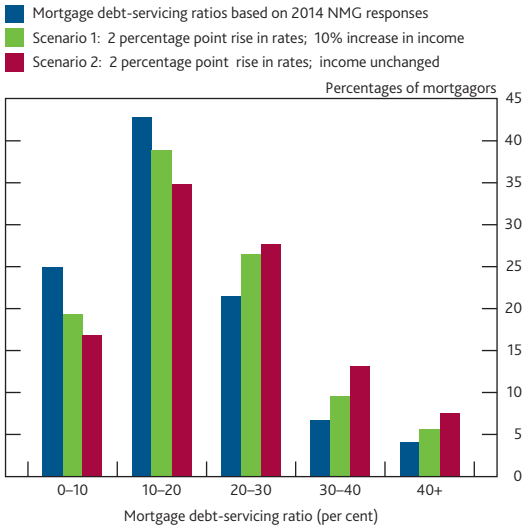
Higher interest rates are likely to increase the number of households with high debt-servicing ratios, which in turn might lead to a rise in arrears. Any definition of what constitutes a household that is particularly vulnerable to distress is somewhat arbitrary. As discussed in the box on pages 422–23, however, there is evidence that the proportion of mortgagors in arrears increases sharply when mortgage repayments exceed 40% of gross income. This section therefore assesses the number of households who might fall into this vulnerable category when interest rates rise.

Bank Rate is likely to rise in a gradual and limited way, alongside increases in household income. Assuming a 10% increase in income for all households, a 2 percentage point rise in mortgage interest rates would be likely to raise the proportion of mortgagors with a DSR of at least 40% from its current level of 4% to around 6% (illustrated by the green bars in **Chart 7**).(2)(3) The number of UK households in this vulnerable category would increase from around 360,000 to 480,000.(4) But the impact would be more severe in a second, less likely, scenario where there was assumed to be no increase in incomes (the red bars in **Chart 7**).

Looking at households as a whole, and taking account of the falling share of households with a mortgage, the proportion of all households with high mortgage debt-servicing ratios is currently low relative to its average since 1991 (Chart 8), and neither of the scenarios described above would result in that share exceeding previous peaks. Under Scenario 1, where income increases by 10% for all households, the share of households with a mortgage DSR above 40% would be likely to remain below its average since the early 1990s,

(1) In addition, changes in Bank Rate are usually passed through to variable-rate products with a lag. See Butt and Pugh (2014).
(2) As mentioned earlier, these estimates may overstate the true impact since they assume immediate pass-through of rates to both fixed and variable-rate mortgages.
(3) Based on the November 2014 *Inflation Report* projections, average nominal post-tax disposable income per household is expected to increase by around 10% by the end of 2017.
(4) The estimate of the number of households in the United Kingdom comes from the ONS 'Families and Households' 2013 publication. This figure was multiplied by the proportion of vulnerable households from the NMG survey to estimate the number of vulnerable households.

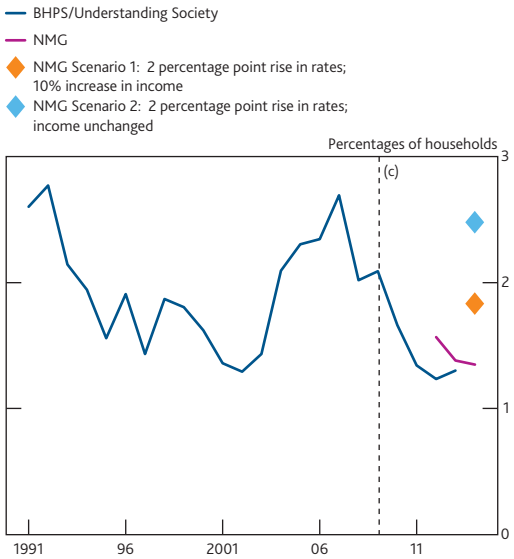
Chart 7 Sensitivity of the distribution of mortgage debt-servicing ratios to higher interest rates(a)



Sources: NMG Consulting survey and Bank calculations.

(a) The mortgage debt-servicing ratio distribution based on the 2014 H2 NMG survey replicates the one in **Chart 2**. 'Scenario 1' denotes the distribution under both a 2 percentage point interest rate increase and a 10% income rise. 'Scenario 2' denotes the distribution under a 2 percentage point increase in interest rates with no change in income. The simulations of the two scenarios assume full pass-through of higher interest rates to all mortgagors. The assumptions listed on page 426 also apply.

Chart 8 Percentage of households with mortgage debt-servicing ratios above 40%(a)(b)



Sources: BHPS, NMG Consulting survey, Understanding Society Survey and Bank calculations.

(a) The mortgage debt-servicing ratio is calculated as total mortgage payments (including principal repayments) as a percentage of pre-tax income. Calculation excludes those whose DSR exceeds 100%. Reported repayments may not account for endowment mortgage premia. BHPS/Understanding Society estimates exclude households for whom more than 1% of income is imputed. 2014 NMG data are from the H2 survey only.
(b) Scenarios 1 and 2 are as described in footnote (a) of **Chart 7**.
(c) BHPS/Understanding Society data to the left of the dashed line are from the BHPS (1991–2008). Data to the right are from Understanding Society (2009–13).

although it is estimated it would approach its previous peaks if there were no increase in household income (Scenario 2).

These experiments illustrate that, unsurprisingly, the outlook for household income is a key factor that will determine the vulnerability of households to a rise in interest rates. There is a risk that the most vulnerable households will experience lower-than-average income growth as rates rise.

Indeed, data from the survey imply that more vulnerable households have more pessimistic income expectations for the next twelve months. The blue bars in **Chart 9**, for instance, show that a net percentage balance of 20% of households with a debt-servicing ratio of at least 40% expect their income to fall over the next year (although the chart does not show by *how much* these households expect income to fall). The time horizon for these income expectations is shorter than the period over which Bank Rate is likely to rise by 2 percentage points. But if these households' expectations are correct then the proportion of households at high DSRs may be similar to, or even higher than, the proportion under the thought experiments where the income of vulnerable households remains unchanged.

Chart 9 Mortgagors' income expectations and change in financial position since 2006(a)

Sources: NMG Consulting survey and Bank calculations.

(a) The mortgage debt-servicing ratio is calculated as total mortgage payments (including principal repayments) as a percentage of pre-tax income. Calculation excludes those whose DSR exceeds 100%. Reported repayments may not account for endowment mortgage premia.
(b) Question: 'Over the next twelve months, how do you expect your household income (before anything is deducted for tax, National Insurance, pension schemes etc) to change?'. Net percentage balance is the percentage of households expecting their income to increase less the percentage expecting it to fall.
(c) Question: 'Would you say you are financially better off or worse off now than you would have expected at the end of 2006, before the start of the financial crisis?'. Net percentage balance is the percentage of households who reportedly are better off now than they had expected in 2006 less the proportion worse off. Those who reported they are better/worse off are given half the weight of those who reported they are much better/worse off.

There is a great deal of uncertainty around the likely distribution of future household income growth, however. Households with the highest DSRs were more likely to report that they were worse off now than they had expected in 2006 (the green bars in **Chart 9**). If these households have based their income expectations on an extrapolation of their recent experiences, then their expectations may prove to be overly pessimistic.

Impact of a rise in rates on household spending

An increase in interest rates would raise the interest payments of borrowers, and may lead them to take action such as cutting spending on other items, regardless of whether they are at serious risk of entering arrears. The first part of this subsection examines the proportion of borrowers that would need to take some kind of action in response to higher interest rates. Raising interest rates would also increase the interest receipts of savers. But the consequent increase in spending by savers is likely to be outweighed by the fall in spending by borrowers, so that aggregate household spending would fall. This is examined in more detail in the second part of this subsection.

Proportion of households that would need to respond to a rise in interest rates

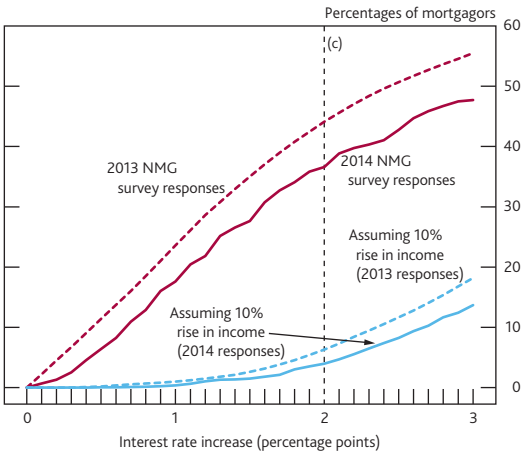
The NMG survey asked households how much their monthly mortgage payments could increase for a sustained period without them having to take some kind of action, such as cutting spending, working longer hours, or requesting a change to their mortgage. And for each household reporting an amount of mortgage debt outstanding, it is possible to calculate the amount by which monthly mortgage payments would increase if interest rates rose by 2 percentage points (or any other amount).(1) Taken together, these figures can be used to calculate the number of households who — for a given rise in rates — will have to take some kind of action.

An estimated 37% of mortgagors would need to take some kind of action if interest rates rose by 2 percentage points while income remained unchanged (shown by the solid red line in **Chart 10**), equivalent to 12% of all households. This is somewhat lower than a year ago (shown by the dashed red line). But if the income of all households were to rise by 10%, the proportion of mortgagors that would need to respond falls to only 4% (the solid blue line in **Chart 10**), equivalent to 1.3% of all households. This percentage is also lower than was estimated from the 2013 survey.

Quantifying the impact of a rise in rates on total household spending

Increases in interest rates should raise the incomes of net savers (households with more savings than debt) and reduce the incomes of net borrowers (households with more debt than savings). The implications of that redistribution of income for aggregate spending will depend on the marginal propensities to consume (MPCs) of borrowers and savers.(2) For savers, the MPC captures what proportion of their extra savings income is spent. For borrowers, the MPC is a measure of how much spending would be cut for each extra pound of income that is diverted to higher interest payments. Since the MPC of savers is typically lower than that of borrowers, aggregate spending is likely to fall through this 'cash-flow' channel.

Chart 10 Proportion of mortgagors that would need to respond to a rise in mortgage rates(a)(b)



Sources: NMG Consulting survey and Bank calculations.

(a) Question asked to mortgagors with discounted, base rate tracker or standard variable-rate mortgages: 'The interest payment on mortgages is often linked to the official interest rate set by the Bank of England. If the rate was to increase, your monthly payments would also increase. About how much do you think your monthly mortgage payments could increase for a sustained period without you having to take some kind of action to find the extra money eg cut spending, work longer hours, or request a change to your mortgage?'. Households on fixed/capped-rate mortgages were asked the following question: 'Although your monthly mortgage payments are currently [fixed/capped] we would like to understand the impact if your payments were to increase tomorrow. About how much do you think your monthly mortgage payments could increase for a sustained period without you having to take some kind of action to find extra money eg cut spending, work longer hours, or request a change to your mortgage?'. The answers were provided in pounds.
(b) Households are defined as having to take action if the additional mortgage payments from higher interest rates (calculated using information on the size of the current outstanding mortgage) exceed the income available to meet higher mortgage payments. The income growth scenario line uses the same calculation but assumes that monthly disposable incomes are increased in line with a 10% increase in annual gross income.
(c) Denotes a 2 percentage point increase in interest rates.

In the survey, households were told how much their interest payments/receipts would increase, in pounds, if interest rates rose by 2 percentage points and were asked how they would respond, assuming no change in their incomes. That increase in interest payments/receipts was calculated using responses for the amount of debt and deposits held from earlier questions in the survey. This should have made it easier for households to respond accurately, by placing the impact of higher rates in the context of their own personal financial situations.

Around 60% of borrowers — both mortgagors and unsecured — reported that they would cut spending in response to a 2 percentage point rise in interest rates (**Table B**). This is higher than the percentage of mortgagors who said that they would need to take action if rates rose by 2 percentage points in **Chart 10**: this may be because **Chart 10** shows the proportion of mortgagors who are estimated to have to take action, whereas **Table B** shows those who would choose to act.

It is useful to compare these results to previous episodes when interest rates were increased. In 2007, the NMG survey asked

(1) The question specifically refers to mortgage payments and does not take account of any possible holdings of unsecured debt.
(2) It will also depend on the share of borrowers versus savers in the economy. As it happens, these balance out: in the latest survey, 27% of households were estimated to be net mortgagors, 20% net unsecured only borrowers, 47% net savers and the remainder reported that they had no savings or debt.

Table B Borrowers' responses to a hypothetical 2 percentage point rise in interest rates[a][b]

Percentages of households

	Mortgagors	Mortgage DSR>=30%	Unsecured only borrowers
Cut spending	57	49	61
Save less	35	21	25
Work more hours/take a second or better paid job	18	24	23
Take up employment myself	2	5	4
Someone else in household will take up employment	4	6	1
Get financial help	5	11	9
Request change to loan	23	21	15
Move somewhere cheaper	9	10	n.a.
Move and rent	6	12	n.a.
Other	6	5	5

Sources: NMG Consulting survey and Bank calculations.

(a) Question: 'If your monthly mortgage/unsecured loan payments were to increase for a sustained period by £x [which is *calculated automatically from software as the payment increase under a 2 percentage point increase in interest rates*], how do you think you would respond? Please assume your income would not be any higher unless you take action to increase it'. Households were allowed to select up to three options.
(b) The table only records the responses of households with net debts. Unsecured borrowers were only asked the question if they had more than £4,999 of unsecured debt.

households how they had responded to increases in interest rates over the preceding year, when Bank Rate had risen from 4.75% to 5.75%. Results from the 2007 survey showed that 50% of mortgagors whose repayments had increased reported that they had cut spending in response to increases in their mortgage payments.(1) That is similar to the proportion of mortgagors who reported that they would cut spending in response to a 2 percentage point rise in interest rates in the 2014 survey.

Table C shows that the proportion of savers who said that they would respond to a rate rise by spending more is considerably smaller than the share of borrowers who would cut spending. Only 10% of savers would spend more, while most would simply allow the extra income to remain in their savings accounts, although it is possible that this extra income could be spent at a later date.

Table C Savers' responses to a hypothetical 2 percentage point rise in interest rates[a][b]

Percentages of households	All savers
Increase spending	10
Do nothing (let interest accumulate)	48
Put more money into savings accounts	38
Work fewer hours	2
Other	2

Sources: NMG Consulting survey and Bank calculations.

(a) Question: 'If the monthly interest you receive on your savings were to increase for a sustained period by £x [which is *calculated automatically from software as the payment increase under a 2 percentage point increase in interest rates*], how do you think you would respond? Please assume your other sources of income would not change'. Households were allowed to select any of the options.
(b) The table only records the responses of households with net savings. Savers were only asked the question if they had more than £4,999 of savings. Households with a mortgage were not asked this question, regardless of their level of savings.

To help estimate the *size* of MPCs for both borrowers and savers — and thus the amount by which aggregate household spending is likely to change when rates rise — the survey asked households who reported that they would change spending to quantify this change.

The survey responses suggest that, when interest rates rise, the average MPC of borrowers out of higher interest payments is expected to be around 0.5.(2) This means that, if the average borrower's monthly interest payments were to increase by £10 when interest rates rise, they would cut spending by £5. The average estimated MPC of savers out of higher interest receipts was much smaller, however, at 0.1, implying that they would spend only £1 more for every £10 of extra savings income.

There is considerable uncertainty in the academic literature over the size of households' marginal propensities to consume. But the estimates from the NMG survey are within the range of literature estimates and are broadly consistent with previous assumptions made by Bank staff (based on that literature).(3) **Overall, these results do not imply that increases in interest rates from their current historically low level would have unusually large effects on household spending. Taken together, the estimates based on the NMG survey imply that a 1 percentage point increase in interest rates could reduce aggregate spending by around 0.5% via a redistribution of income from borrowers to savers (the cash-flow effect).**(4) And a 2 percentage point rise in interest rates could reduce spending by around 1% through this channel.

On the one hand, as noted above, these estimates are likely to overstate the effect on consumption of Bank Rate increasing, to the extent that the pass-through of interest rates is assumed to be full and instant and incomes are assumed to remain unchanged. On the other hand, however, these estimates only measure the cash-flow effect of changes in interest rates. The total reduction in household spending from a 1 percentage point rise in interest rates, keeping incomes constant, is likely to be larger than 0.5%. For example, as discussed in the box on pages 422–23, changes in interest rates may also affect spending by altering households' marginal decisions about whether to take on additional borrowing or to postpone spending to the future.

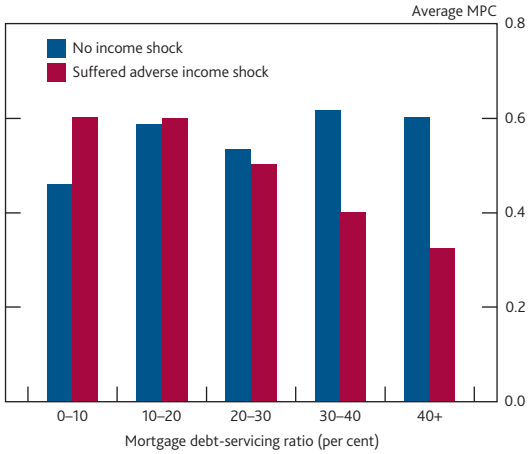
(1) This question was only asked to variable-rate mortgagors and those whose fixed-rate deals had expired. See Waldron and Young (2007) for more details.
(2) These aggregate MPCs are weighted by net debt/deposits to provide an estimate of how the aggregate spending of each group will change.
(3) Recent internal work by Bank staff has assumed MPCs of 0.5 for borrowers and 0.2 for savers.
(4) This impact on aggregate spending was calculated by summing the reported increase in spending across savers less the total reduction in spending by borrowers. Those estimates were then scaled by estimates of total current consumption from the survey. See the footnote to **Chart 12** for more details.

Responses of more vulnerable mortgagors

Evidence from the NMG survey and other work suggests that more highly indebted households, on average, cut spending by more following the financial crisis.(1) But in the 2014 survey, mortgagors with higher debt-servicing ratios reported that they were not more likely to respond to higher interest rates by cutting spending than other mortgagors (**Table B**).(2)

One reason why households with high debt-servicing ratios might not be more likely to cut spending when rates increase is that those households may still be adjusting to past income shocks, and so will not have scope to cut spending further when rates rise. **Chart 11** shows that the estimated MPCs of households out of higher interest payments were a little larger for mortgagors at high DSRs if they had not suffered an income shock in the past (defined as being worse off now than they had expected in 2006 or seeing their income fall since they took out their mortgage). But the opposite was true for households who had suffered a negative income shock: those with higher DSRs reported lower MPCs. That may be because these households have already cut spending significantly (consistent with the evidence in **Table A**) and so have less scope to adjust in future. Again, this illustrates the importance of developments in income for potentially vulnerable households. If they do not experience any increase in their wages and are not able to increase their income in other ways or cut spending sufficiently, there is a greater risk that they will enter arrears when rates rise.

Chart 11 Marginal propensity to consume of mortgagors, split by debt-servicing ratio and whether experienced an income shock(a)



Sources: NMG Consulting survey and Bank calculations.

(a) Questions: 'If your monthly mortgage loan payments were to increase for a sustained period by £x [which is *calculated automatically from software as the payment increase under a 2 percentage point increase in interest rates*], how do you think you would respond? Please assume your income would not be any higher unless you take action to increase it.' Households were allowed to select up to three options. Respondents who reported they would cut spending were then asked 'How much would you reduce your monthly spending by in this situation?'. The marginal propensity to consume is calculated as the reported change in spending as a share of the change in interest payments. Respondents who reported that they would not change spending were given an MPC of zero. Respondents who reported that they would cut spending but did not respond to the question about by how much were assumed to have an MPC of 1 (the median response for those who did say they would change spending). A household is defined as having suffered an adverse income shock if they reported being worse off now than they expected in 2006 or that their income had fallen since they took out their mortgage. The mortgage DSR is calculated as total mortgage payments (including principal repayments) as a percentage of pre-tax income. Calculation excludes those whose DSR exceeds 100%. Reported repayments may not account for endowment mortgage premia.

Instead of responding to higher interest rates by cutting spending, however, households at higher debt-servicing ratios reported that they would be more likely to seek to raise additional income, for example by increasing employment or working more hours (**Table B**). Indeed, **Table A** from the previous section suggests that households have already responded to concerns about debt by raising their labour supply in the past.

Distributional impact of higher interest rates

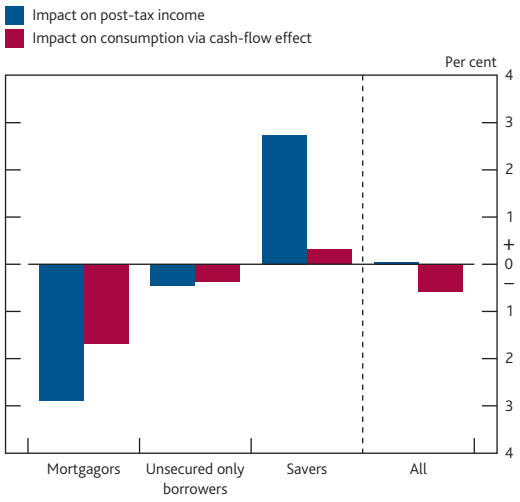
Alongside assessing the aggregate impact of higher interest rates, the NMG survey can be used to assess the potential distributional impacts. In this section, information on the distribution of debt and deposits from the survey, and on how households reported that they would adjust spending are used to estimate how raising rates might affect the disposable income and consumption of different groups in society. As above, the consumption impacts are based only on the cash-flow effects of redistributing income from borrowers to savers, not the total spending impact.

Changes in monetary policy always affect different parts of the population in different ways. One obvious distributional impact of raising interest rates is that it redistributes income from borrowers to savers. A 1 percentage point rise in interest rates is estimated to raise the interest payments of mortgagors by just under 3% of their post-tax income, whereas higher interest receipts increase the income of savers by a similar amount (blue bars in **Chart 12**). But borrowers reported that they would cut spending by more than savers would increase it because they have a higher MPC, and hence aggregate spending should be expected to fall (red bars in **Chart 12**).

While raising interest rates — all else constant — will make savers better off and borrowers worse off than they are now, the reduction in Bank Rate from 5% to 0.5% between October 2008 and March 2009 will have benefited borrowers at the expense of savers.(3) Even when Bank Rate does start to rise, it is likely to remain below its historical average for some time. The returns on savings products are therefore likely to also remain lower than before the financial crisis, but just to a lesser extent than is currently the case. But without the loosening in monetary policy during the financial crisis, economic growth would likely have been lower and unemployment higher. That would have had a significant,

(1) See Bunn and Rostom (2014).
(2) In **Table B**, a slightly wider definition of vulnerable mortgagors is used (DSR of at least 30%), in order to account for those households who might have a very high ratio (greater than 40% DSR) when rates rise.
(3) The MPC's programme of asset purchases, or 'quantitative easing' (QE) will also have had distributional impacts. QE is likely to have boosted the wealth of households holding financial assets. Incomes of those already drawing a pension before QE began will have been unaffected. The implications of QE for those approaching retirement and for pension providers will have depended on the type of pension scheme and how well it was funded. See Bank of England (2012) for more details.

Chart 12 Impact of a 1 percentage point rise in interest rates on income and spending of borrowers and savers[a]



Sources: NMG Consulting survey and Bank calculations.

(a) Mortgagors are defined as households with a mortgage who have positive net debt, unsecured borrowers are non-mortgagors with positive net debt and savers are households with net savings. Post-tax income is calculated by deducting estimates of National Insurance and income tax from reported total gross household income. Current consumption is estimated as post-tax income less regular saving. For each household, the impact of a 1 percentage point rise in interest rates on annual interest payments/receipts is calculated as 1% of current net debt/deposits. Those estimates are then aggregated and scaled by current annual post-tax income. For each household, the impact on consumption is estimated as the change in interest payments/receipts multiplied by their reported MPC out of higher interest payments/receipts from the survey (see footnote to **Chart 11** for more details on how MPCs were calculated). Those estimates are then aggregated and scaled by estimated current consumption. Unsecured borrowers and savers with debt/deposits of less than £5,000 were not asked how they would respond to higher interest rates and are therefore assumed to have an MPC of zero.

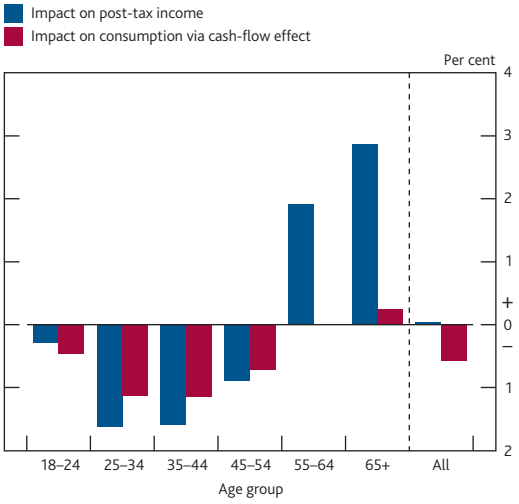
detrimental impact on all groups in society. Any assessment of the distributional implications must be seen in that light.

Borrowers and savers are not evenly distributed across age groups, which implies that higher interest rates will have different impacts on different age groups. On average, the reduction in income and spending is likely to be larger for households aged between 25 and 44, since they are more likely to be borrowers.(1) But higher rates would increase the income of older households, on average, since they are more likely to be savers, although these households do not expect to make much change to their spending in response (**Chart 13**).

By region, higher interest rates are not expected to have substantially different effects (**Chart 14**). Debt levels are estimated to be higher in the South which implies that a rise in interest rates will have a larger impact on the interest payments of borrowers in that region. But overall, the differences in the estimated impacts on income and spending between regions are small relative to the distributional effects among other dimensions that are discussed in this section.

Higher interest rates are likely to have different effects across the income distribution. Lower income groups are likely to be made better off by higher interest rates (**Chart 15**). Partly that is because those groups include some pensioners who have relatively low current incomes, but larger stocks of deposits.

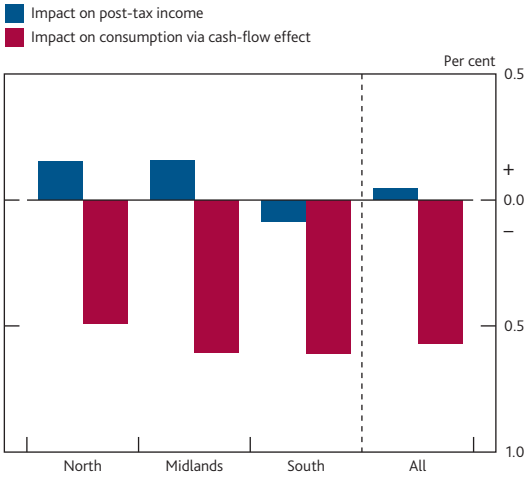
Chart 13 Impact of a 1 percentage point rise in rates on income and spending by age[a]



Sources: NMG Consulting survey and Bank calculations.

(a) Calculated using the methodology explained in the footnote to **Chart 12**. Results for borrowers and savers within each age group are then aggregated.

Chart 14 Impact of a 1 percentage point rise in rates on income and spending by region[a][b]



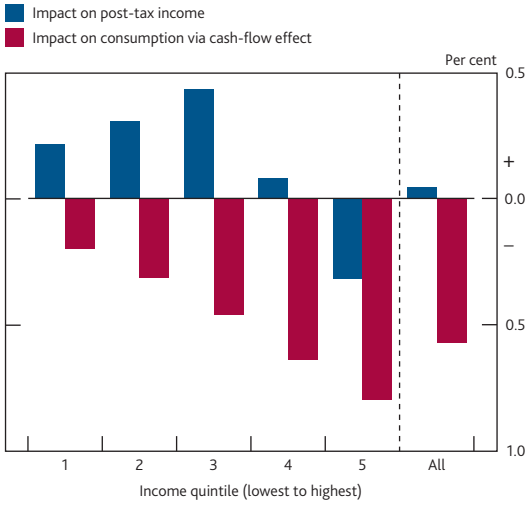
Sources: NMG Consulting survey and Bank calculations.

(a) Calculated using the methodology explained in the footnote to **Chart 12**. Results for borrowers and savers within each region are then aggregated.
(b) North is defined as North, North West, Yorkshire and Humberside, and Scotland. Midlands is defined as East Midlands, West Midlands, East Anglia and Wales. South is defined as London, South East and South West. The results are aggregated into North, Midlands and Southern regions because at Government Office region level, the sample sizes for some regions are small.

When households aged over 65 are excluded, the reductions in income and spending are still expected to be largest for the higher income groups (**Chart 16**). This is because the higher income groups also tend to have the largest debt to income ratios.

(1) The ratios of the consumption impacts to the income impacts on **Charts 13** to **16** cannot be interpreted as the average marginal propensities to consume of households within that group. Each group contains both borrowers and savers and the impacts shown are the net of the positive effect on savers within each group less the negative effect on borrowers. The income effects are also expressed as a percentage of overall income, which is higher than overall consumption, which is used to scale the consumption impacts.

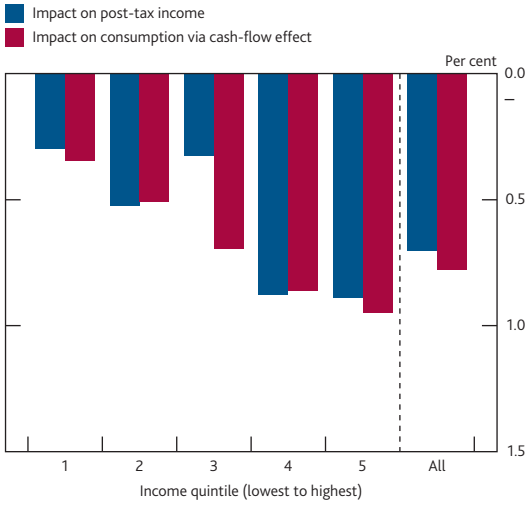
Chart 15 Impact of a 1 percentage point rise in rates on income and spending by income quintile[a]



Sources: NMG Consulting survey and Bank calculations.

(a) Calculated using the methodology explained in the footnote to **Chart 12**. Results for borrowers and savers within each income quintile are then aggregated.

Chart 16 Impact of a 1 percentage point rise in rates on income and spending by income quintile excluding over 65s[a]



Sources: NMG Consulting survey and Bank calculations.

(a) Calculated using the methodology explained in the footnote to **Chart 12**. Results for borrowers and savers within each income quintile are then aggregated.

Conclusion

Higher interest rates will increase financial pressure on households with high levels of debt. The percentage of households with high debt-servicing ratios, who would be most at risk of financial distress, is not expected to exceed previous peaks given the likely paths of interest rates and income. But developments in incomes for the households who are potentially most vulnerable will be an important determinant of the extent to which financial distress does increase.

Estimates of marginal propensities to consume out of higher interest payments and receipts from the survey are broadly in line with previous estimates, and do not imply that gradual increases in interest rates from their current historically low levels will have unusually large effects on household spending. On average, more vulnerable mortgagors reported that they are not expecting to make larger cuts in spending than other mortgagors when rates increase. That may be because they are still adjusting to past shocks and so do not have scope to make further large cuts in spending when rates rise. However, some do say that they expect to respond in other ways, such as by increasing their labour supply.

As usual, raising interest rates will have significant distributional consequences. It will make borrowers worse off and savers better off, holding other factors constant. On average, younger households, who are more likely to be borrowers, will be worse off, while older households, who are more likely to be savers, will gain. Higher-income households will typically be more adversely affected than low-income households, but differences in the impact between regions are likely to be small.

References

Andersen, A L, Duus, C and Jensen, T L (2014), 'Household debt and consumption during the financial crisis: evidence from Danish micro data', *Danmarks NationalBank Working Paper No. 89*.

Bank of England (2012), 'The distributional effects of asset purchases', available at www.bankofengland.co.uk/publications/Documents/news/2012/nr073.pdf.

Bunn, P, Domit, S, Piscitelli, L, Rostom, M and Worrow, N (2013), 'The financial position of British households: evidence from the 2013 NMG Consulting survey', *Bank of England Quarterly Bulletin*, Vol. 53, No. 4, pages 351–60, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2013/qb130406.pdf.

Bunn, P, Johnson, R, Le Roux, J and McLeay, M (2012), 'Influences on household spending: evidence from the 2012 NMG Consulting survey', *Bank of England Quarterly Bulletin*, Vol. 52, No. 4, pages 332–42, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/qb120403.pdf.

Bunn, P and Rostom, M (2014), 'Household debt and spending', *Bank of England Quarterly Bulletin*, Vol. 54, No. 3, pages 304–15, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2014/qb14q304.pdf.

Butt, N and Pugh, A (2014), 'Credit spreads: capturing credit conditions facing households and firms', *Bank of England Quarterly Bulletin*, Vol. 54, No. 2, pages 137–47, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2014/qb14q203.pdf.

Dynan, K (2012), 'Is a household debt overhang holding back consumption?', *Brookings Papers on Economic Activity*, Vol. 44, No. 1, pages 299–362.

Mian, A, Rao, K and Sufi, A (2013), 'Household balance sheets, consumption, and the economic slump', *Quarterly Journal of Economics*, Vol. 128, No. 4, pages 1,687–726.

Shakir, T and Tong, M (2014), 'The interaction of the FPC and the MPC', *Bank of England Quarterly Bulletin*, Vol. 54, No. 4, pages 396–408, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2014/qb14q403.pdf.

Waldron, M and Young, G (2007), 'Household debt and spending: results from the 2007 NMG Research survey', *Bank of England Quarterly Bulletin*, Vol. 47, No. 4, pages 512–21, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/qb070401.pdf.

Recent economic and financial developments

Markets and operations

- International monetary policy diverged over the review period, with the Federal Reserve bringing an end to 'tapering', while the European Central Bank and the Bank of Japan both announced further loosening.
- Long-term interest rates declined somewhat, continuing the downward trend observed since the start of the year. Contacts attributed the fall to a combination of changes in both the expected path of policy and the level of long-run real rates, as well as reductions in term premia.
- Moves in exchange rates were broadly in line with developments in the outlook for the international economy and central bank policy. There was a modest pickup in volatility in the foreign exchange market.
- In October, worries about low growth contributed to a period of heightened volatility in a number of markets, with the turbulence thought to have been exacerbated by low market liquidity. Some risky asset prices fell during the episode but subsequently recovered much of the lost ground.

Overview

UK short-term market interest rates fell significantly over the review period. That reflected both domestic data and a weakening in the outlook for the international economy — and the resulting expectation among market participants that monetary policy tightening was likely to occur later than previously thought.

There was also a decline in UK long-term interest rates over the review period, in line with movements overseas. Contacts pointed to a number of drivers, placing significant weight on the slowing in the expected pace of monetary tightening and lower expected long-run policy rates. Contacts also thought that the term premium required to hold long-maturity assets had fallen.

In the United States, the Federal Reserve stopped increasing the stock of assets held under its quantitative easing programme, bringing to an end its 'tapering' of asset purchases. In contrast, reflecting rising concerns about the outlook for domestic growth and inflation, both the European Central Bank and the Bank of Japan announced further material loosening in monetary policy.

Divergence in the outlook for growth and the path of monetary policy in different countries caused movements in major currency pairs and there was a rise in exchange rate volatility over the review period. The sterling effective rate index declined around 1%, consistent with revised market expectations for the path of monetary policy tightening in the United Kingdom.

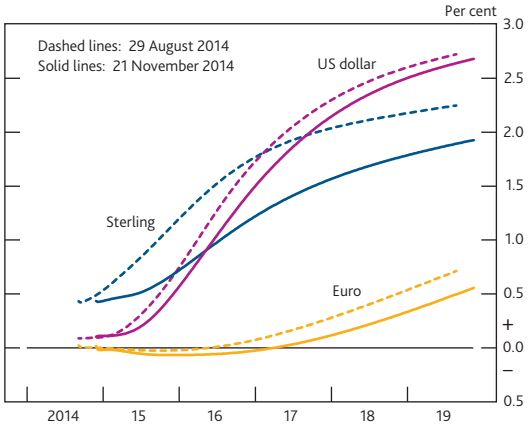
Worries about the outlook for international growth — with contacts citing various risks, ranging from geopolitical tensions to concern about the possible spread of the Ebola virus — led to falls in risky asset prices and a sharp rise in volatility across asset classes in the middle of October. Much of the sell-off in equity prices later unwound, but corporate bond spreads increased over the period as a whole.

In discharging its responsibilities to ensure monetary and financial stability, the Bank gathers information from contacts across a range of financial markets. Regular dialogue with market contacts provides valuable insights into how markets function and provides context for the formulation of policy, including the design and evaluation of the Bank's own market operations. The first section of this article reviews developments in financial markets between the 2014 Q3 *Quarterly Bulletin* and 21 November 2014. The second section describes the Bank's operations within the Sterling Monetary Framework.

Monetary policy and interest rates

In the United Kingdom, there was a material decline in short-term market interest rates over the review period (**Chart 1**). The fall in short-term interest rates reflected both domestic data and a weakening in the outlook for the international economy. As a result, the expected timing of the first increase in Bank Rate, as implied by market interest rates, was pushed out substantially, and the expected pace of subsequent Bank Rate rises slowed. US and euro-area short-term interest rates also fell over the review period.

Chart 1 Instantaneous forward interest rates derived from overnight index swap (OIS) contracts[a]



Sources: Bloomberg and Bank calculations.

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

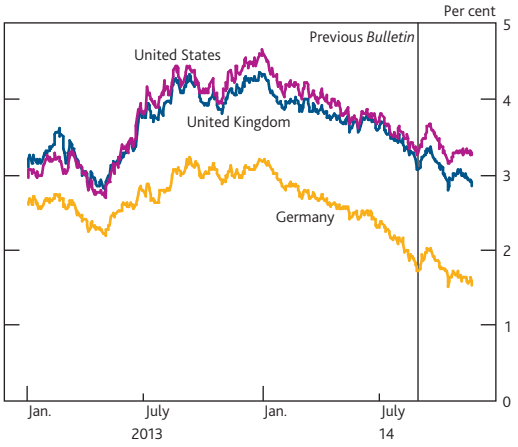
In the United States, the Federal Open Market Committee (FOMC) concluded its programme of asset purchases following the October policy meeting. The FOMC also restated the guidance that it would remain appropriate to maintain the current target range for the federal funds rate for a considerable period of time.

In contrast, the European Central Bank (ECB) and the Bank of Japan (BoJ) both announced further monetary policy easing in the light of growing concerns about growth and weak inflation in those economies. In September, the ECB Governing Council announced a further 10 basis point cut in its benchmark interest rates, and also said that it would commence purchases of asset-backed securities (ABS) and covered bonds. Later in the review period, President Draghi confirmed that the ECB planned to expand its balance sheet significantly. Contacts typically believed that this would require purchases of corporate bonds or sovereign debt in addition to ABS and covered bonds.

At the end of October, the BoJ surprised market participants by extending its asset purchase programme. The BoJ increased its purchases of Japanese government bonds from ¥50 trillion to ¥80 trillion per annum and tripled its purchases of exchange-traded funds (ETFs) and real estate investment trusts (REITs). There was a significant financial market reaction, including falls in Japanese government bond yields and a weakening of the yen. Later in the review period, the Japanese government provided additional support to spending by delaying a scheduled increase in consumption tax.

International long-term nominal interest rates continued to decline (**Chart 2**). In part, contacts thought that this reflected a growing expectation among market participants that the long-run neutral level of interest rates was likely to be lower than in the past. And in the United Kingdom, in particular, there had been a continued shift into bonds by liability-driven investors, such as life insurers and pension funds, causing a decline in the term premium on fixed-income assets.

Chart 2 Selected five-year government bond yields, five years forward[a]



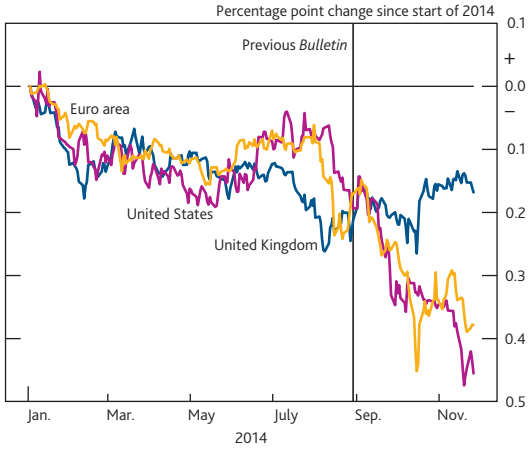
Sources: Bloomberg and Bank calculations.

(a) Forward yields derived from the Bank's government liability curves.

Meanwhile, falls in long-run nominal interest rates in the United States and euro area were, in part, due to lower market-implied inflation expectations. For example, both dollar and euro five-year inflation swaps, five years forward, fell markedly over the review period (**Chart 3**). Contacts attributed this to declines in the price of oil and weakening global growth prospects. In contrast, UK market-implied expectations rose slightly over the review period, which contacts attributed to increased demand from domestic

liability-driven investors for inflation-linked bonds. Contacts also pointed to the fact that the relatively high share of taxation in UK petrol prices tended to lessen the impact of changes in oil prices on headline inflation.

Chart 3 Selected five-year inflation swap rates, five years forward[a]



Sources: Bloomberg and Bank calculations.

(a) Forward swap rates derived from the Bank's inflation swap curves.

Around the middle of October there were sharp falls in international interest rates amid a brief episode of heightened volatility. The proximate cause was a disappointing US data outturn, but this occurred against the backdrop of a steady flow of disappointing data in the euro area since the summer, and contacts noted a growing list of downside risks as being among the contributory factors: geopolitical tensions in Ukraine and the Middle East; slowing growth in China; declining oil prices; and rising concern about the spread of the Ebola virus.

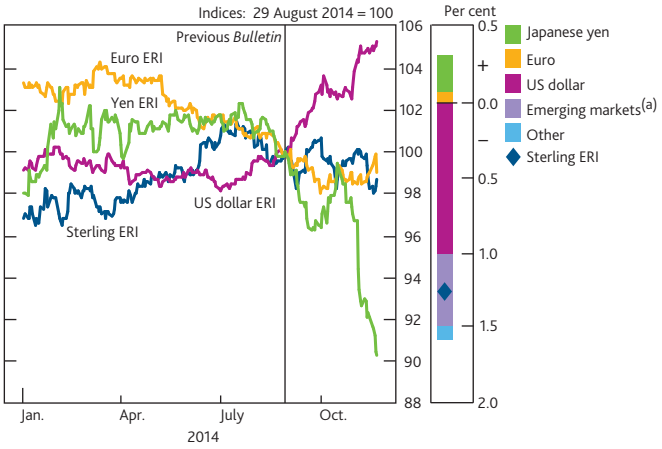
Notably, during the most volatile period there were signs of illiquidity in the market for US Treasuries — usually thought to be one of the deepest and most liquid financial markets. And many contacts found the magnitude of the declines in bond yields surprising. Contacts suggested that the price moves may have been made more abrupt due to the rapid closure of positions that investors had taken in anticipation of increases in US interest rates. Contacts also thought that volatility may have been exacerbated by a reluctance of traditional market makers to provide liquidity during the episode.

Euro-area periphery sovereign bond yields meanwhile rose during the period of heightened volatility as investors demanded higher returns for holding riskier assets. For most of these countries, however, yields fell back down over the following weeks and ended the review period relatively unchanged. Greek sovereign bond yields increased by more than those of other countries and remained elevated, which contacts attributed to political uncertainty there.

Foreign exchange

Sterling had been a focus of foreign exchange markets for much of the past year due to strong economic data and the expectation that monetary policy tightening would occur in the United Kingdom before other G10 economies. But weaker-than-expected domestic data pushed out market expectations for the timing of the first rise in Bank Rate. This caused much of the speculative interest in further sterling appreciation to dissipate. Contacts also reported that the shift in focus away from sterling was also partly driven by uncertainty related to the Scottish referendum. Sterling declined over the review period as a whole, with the sterling ERI falling by 1.3% (**Chart 4**).

Chart 4 Selected exchange rate indices (left-hand side) and contributions to changes in the sterling ERI since 29 August 2014 (right-hand side)



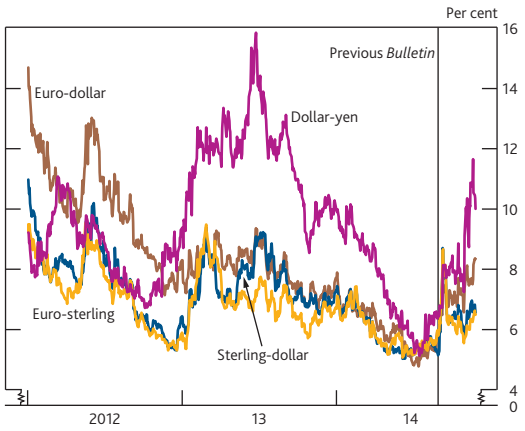
Sources: Bloomberg, European Central Bank, Thomson Reuters Datastream and Bank calculations.

(a) The emerging market currencies in the narrow sterling ERI are: Chinese renminbi, Czech koruna, Indian rupee, Polish zloty, Russian rouble, South African rand and Turkish lira.

Contacts reported that participants in the foreign exchange market were now placing particular emphasis on the macroeconomic and policy divergence between the United States on the one hand, and the euro area and Japan on the other. Consistent with that view, the US dollar ERI increased by around 5% over the review period, due to both strong economic data and further moves towards normalisation of monetary policy. Meanwhile, the yen ERI fell by nearly 10% over the review period, and the yen reached new seven-year lows against the US dollar (**Chart 4**).

The volatility of most major currency pairs implied by options markets increased in September (**Chart 5**). In the case of sterling, contacts reported that this was partly driven by the uncertainty related to the Scottish referendum. But implied volatility of other currency pairs also picked up around this time, and has remained relatively high compared to earlier in the year. This upward move has been particularly notable in the euro-dollar and dollar-yen exchange rates, reflecting both higher observed volatility and uncertainty about the economic outlook and relative stance of monetary policy.

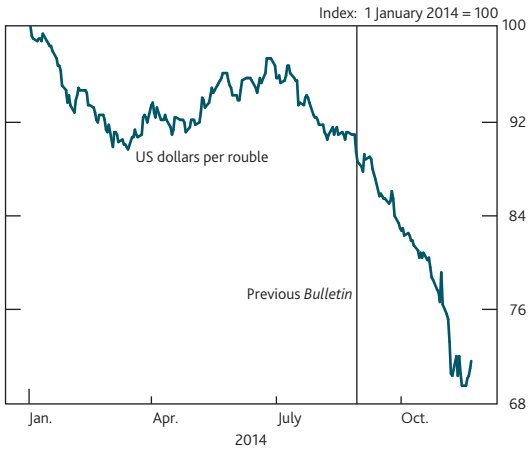
Chart 5 Three-month option-implied volatility of foreign exchange rates



Source: Bloomberg.

Elsewhere, the Russian rouble has fallen by over 19% since the start of the review period (**Chart 6**). A number of factors were said by contacts to have contributed to the currency's decline, including continuing tensions in Ukraine and associated sanctions, and a sharp decline in the oil price, with resultant pressure on the Russian balance of trade. In mid-November, the Central Bank of Russia announced it had abandoned the rouble trading band and would allow the exchange rate to be determined by market factors. It also limited access to its foreign exchange swaps to try to stabilise foreign exchange market conditions.

Chart 6 Russian rouble versus US dollar exchange rate

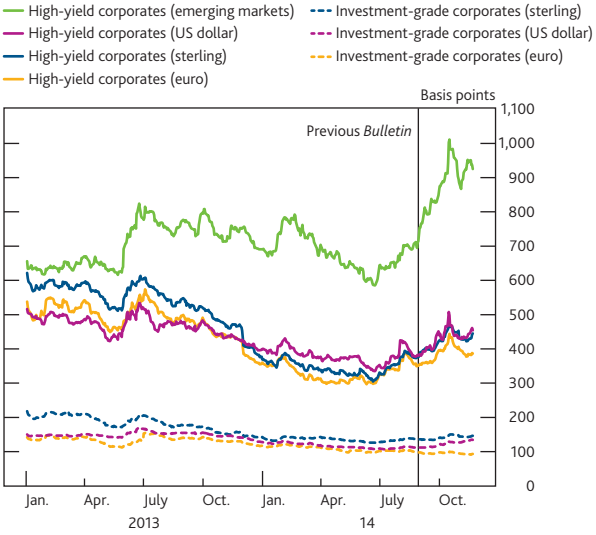


Source: Bloomberg.

Corporate capital markets

Following the usual seasonal summer lull, bond issuance by UK private non-financial corporations picked up significantly in September, and there was further modest issuance over the remainder of the review period. There continued to be a measured repricing under way in advanced-economy high-yield corporate bond markets, with further increases in credit spreads over the review period (**Chart 7**). This was thought by contacts to be in part the result of a gradual rise in the risk premium in the high-yield corporate bond market, which they suggested had become overvalued during the first half of the year. There was also an uptick in UK and US investment-grade corporate bond spreads over the review period. The lack of a corresponding increase in euro-area investment-grade bond spreads was thought to be due to the expectation that the ECB would embark upon some form of corporate or sovereign bond-based asset purchase programme in the near future.

Chart 7 International corporate bond option-adjusted spreads



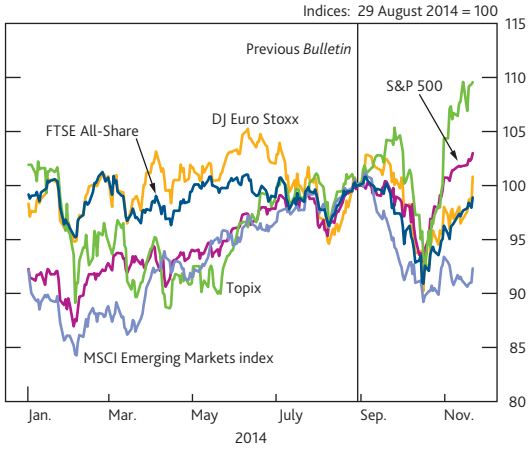
Source: BofA Merrill Lynch Global Research.

There was a short-lived pickup and fall back in corporate bond spreads in October, coinciding with the period of cross-asset volatility (**Chart 7**). However, trading conditions were thought to have remained orderly during the episode. Spreads subsequently resumed their more gradual upward trend.

In common with developments in other markets, there was also a brief fall in international equity prices in mid-October (**Chart 8**). While much of the decline in equity prices subsequently unwound, emerging market stocks remained lower than at the start of the review period, with the MSCI Emerging Markets index down by 7.7%. Contacts attributed this decline to fundamental factors such as weaker earnings growth. In contrast, the S&P 500 index recovered earlier declines and returned to all-time nominal highs, consistent with the stronger perceived economic outlook in the United States compared with other parts of the world. Implied volatility in equity markets across advanced economies picked up in the middle of October consistent with the sell-off in risky asset markets, but has since fallen back to near-record lows (**Chart 9**).

Following strong issuance in the first half of the year, there was a marked slowdown in the overall value of UK initial public offerings (IPOs) (**Chart 10**). The brief episode of

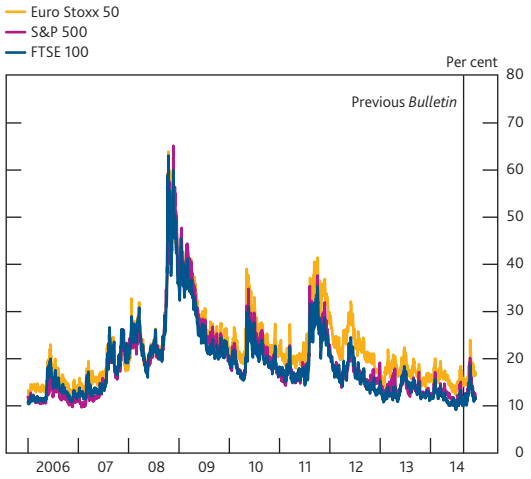
Chart 8 International equity indices[a][b]



Sources: Bloomberg and Bank calculations.

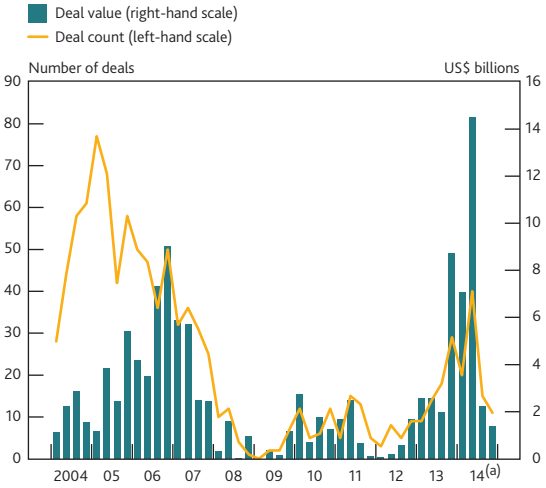
(a) Indices are quoted in domestic currency terms, except for the MSCI Emerging Markets index, which is quoted in US dollar terms.
(b) The MSCI Emerging Markets index is a free-float weighted index that monitors the performance of stocks in global emerging markets.

Chart 9 Three-month forward option-implied volatility in equity markets



Source: Bloomberg.

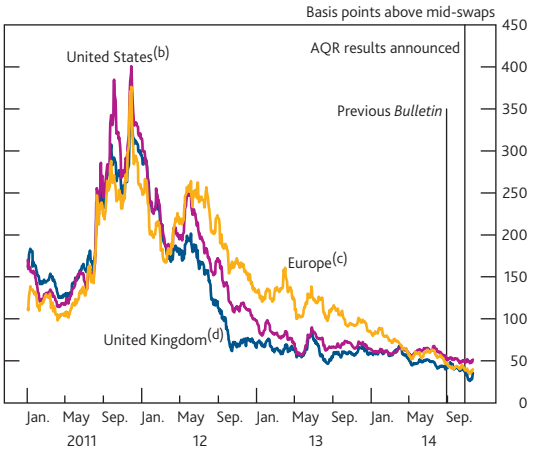
Chart 10 Total value and number of initial public offerings by UK firms



Source: Dealogic.

(a) Data up to 21 November 2014.

Chart 11 Indicative senior unsecured bank bond spreads[a]



Sources: Bloomberg, Markit Group Limited and Bank calculations.

(a) Constant-maturity unweighted average of secondary market spreads to mid-swaps of banks' five-year senior unsecured bonds, where available. Where a five-year bond is unavailable, a proxy has been constructed based on the nearest maturity of bond available for a given institution and the historical relationship of that bond with the corresponding five-year bond.
(b) Average of Bank of America, Citi, Goldman Sachs, JPMorgan Chase & Co., Morgan Stanley and Wells Fargo.
(c) Average of Banco Santander, BBVA, BNP Paribas, Crédit Agricole, Credit Suisse, Deutsche Bank, ING, Intesa, Société Générale, UBS and UniCredit.
(d) Average of Barclays, HSBC, Lloyds Banking Group, Nationwide, Royal Bank of Scotland and Santander UK.

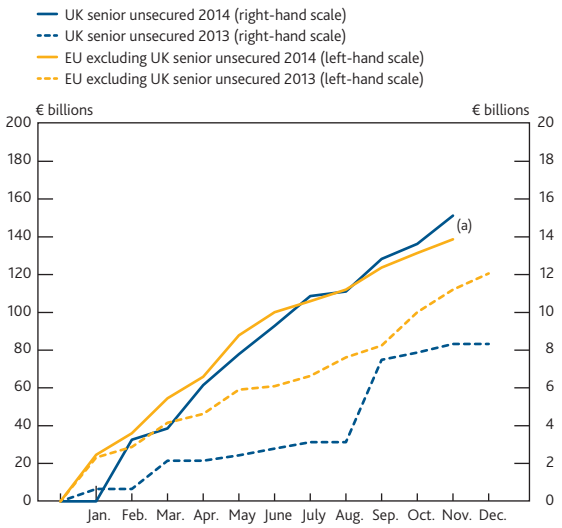
volatility in October caused a number of IPOs to be cancelled or postponed, as flotations typically require calm market conditions to proceed. Contacts did not expect the pace of IPOs to increase over the rest of the year. In contrast, US IPOs picked up significantly, which was attributed by contacts to the relative resilience of the US market, which is considerably deeper than in Europe. There were 49 US IPOs in October and November alone, worth a total of US$16 billion.

Bank funding markets

In the secondary market, spreads on European and UK bank debt declined a little further (**Chart 11**). Lenders also continued to issue both senior unsecured (**Chart 12**) and covered bonds in the primary market. Bank funding markets were subdued in October, thought to be because issuers were waiting until after the publication of the results of the ECB's asset quality review (AQR).

Market participants viewed the outcome of the AQR and stress tests as generally positive and more credible than previous exercises and felt the review provided some assurance about the quality of European banks' assets. In the case of the UK banking sector, contacts continued to look ahead to the upcoming results of the Bank of England's stress test of UK lenders, due to be published in mid-December. There was little market reaction to the Financial Stability Board's announcement of its proposal for banks to hold a minimum level of total loss-absorbing capacity (TLAC).

Chart 12 Senior unsecured bond issuance by UK and European (excluding UK) lenders in public markets



Sources: Bloomberg and Bank calculations.

(a) Data to 21 November 2014.

Operations

Operations within the Sterling Monetary Framework and other market operations

This section describes the Bank's operations within the Sterling Monetary Framework (SMF) over the review period, and other market operations. The Bank widened access to its SMF to accept broker-dealers and central counterparties (CCPs) on 5 November 2014.(1)

The level of central bank reserves is determined by (i) the stock of reserves injected via the Asset Purchase Facility (APF); (ii) the level of reserves supplied by operations under the SMF; 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. As a consequence, 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

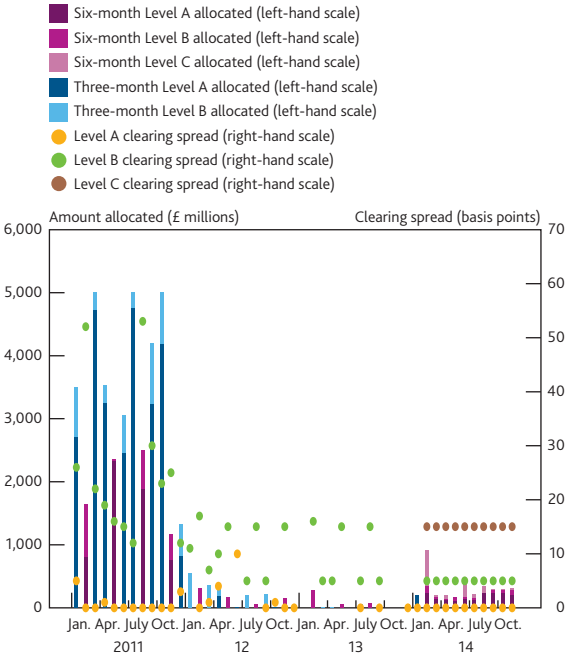
The Bank conducts Indexed Long-Term Repo (ILTR) operations as part of its provision of liquidity insurance to banks, building societies and broker-dealers. These typically occur once every calendar month. During the review period, the Bank offered a minimum of £5 billion via six-month ILTR operations on 9 September, 7 October and 11 November 2014 (**Table A**).

Over the quarter, and in line with recent quarters, the aggregate level of reserves supplied by the Bank through quantitative easing (QE) remained in excess of the level that would otherwise be demanded by market participants. Usage of the ILTR therefore remained limited (**Chart 13**).

Table A Indexed Long-Term Repo operations

	Total	Collateral set summary		
		Level A	Level B	Level C
9 September 2014 (six-month maturity)				
Minimum on offer (£ millions)	5,000			
Total bids received (£ millions)	299	245	49	5
Amount allocated (£ millions)	299	245	49	5
Clearing spread (basis points)		0	5	15
7 October 2014 (six-month maturity)				
Minimum on offer (£ millions)	5,000			
Total bids received (£ millions)	288	250	33	5
Amount allocated (£ millions)	288	250	33	5
Clearing spread (basis points)		0	5	15
11 November 2014 (six-month maturity)				
Minimum on offer (£ millions)	5,000			
Total bids received (£ millions)	317	205	87	25
Amount allocated (£ millions)	317	205	87	25
Clearing spread (basis points)		0	5	15

Chart 13 ILTR reserves allocation and clearing spreads(a)



(a) Where there has not been any allocation to a collateral set, no clearing spread is marked.

Contingent Term Repo Facility

The Contingent Term Repo Facility (CTRF) is a contingent liquidity facility, designed to mitigate risks to financial stability arising from a market-wide shortage of short-term sterling

(1) Further details are available at www.bankofengland.co.uk/publications/Pages/news/2014/144.aspx.

liquidity.[1] The Bank judged that, in light of market conditions, CTRF auctions were not required in the review period.

Discount Window Facility

The bilateral on-demand Discount Window Facility (DWF) is aimed at institutions experiencing a firm-specific or market-wide shock. It allows participants to borrow highly liquid assets in return for less liquid collateral in potentially large size and for a variable term. The average daily amount outstanding in the DWF in the three months to 30 June 2013, lent with a maturity of more than 30 days, was £0 million.

Other operations

Funding for Lending Scheme

The Funding for Lending Scheme (FLS) (henceforth 'the Scheme') was launched by the Bank and HM Treasury on 13 July 2012. The initial drawdown period for the Scheme ran from 1 August 2012 until 31 January 2014. The drawdown period for the FLS extension opened on 3 February 2014 and will run until 29 January 2016.[2] The quantity each participant can borrow in the FLS is linked to their lending to the UK real economy, with the incentives skewed towards supporting small business lending.[3]

The Bank publishes quarterly data showing, for each group participating in the FLS extension, the amount borrowed from the Bank and the net quarterly flows of lending. During the three months ending 30 September 2014, eleven of the 38 groups participating in the FLS extension made drawdowns totalling £2.0 billion. Participants also repaid £0.1 billion from the first stage of the FLS. This took outstanding aggregate drawings under the Scheme to £47.6 billion.[4]

US dollar repo operations

On 23 April 2014 in co-ordination with other central banks and in view of the improvement in US dollar funding conditions, the Bank ceased the monthly 84-day US dollar liquidity-providing operations. The current timetable for the seven-day operations will continue until further notice. The network of bilateral central bank liquidity swap arrangements provides a framework for the reintroduction of US liquidity operations if warranted by market conditions.[5] There was no use of the Bank's US dollar facilities during the review period.

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 (CRDs). 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 £5.3 billion of gilts and £0.3 billion of other debt securities.

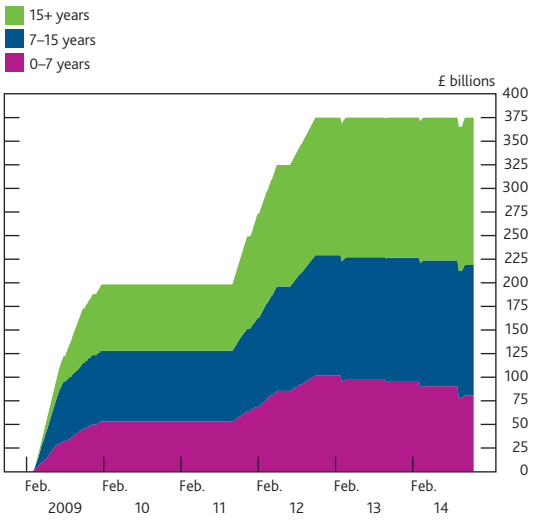
Asset purchases

Gilts

Alongside the publication of the *Inflation Report* on 12 February 2014, the Monetary Policy Committee announced that it intends to maintain the stock of purchased assets, including reinvesting the cash flows associated with all maturing gilts held in the APF, at least until Bank Rate has been raised from its current level of 0.5%.[6] In line with this, the cash flows associated with the redemption of the September 2014 gilt owned by the APF were reinvested. Reinvestment operations took place in the weeks beginning 8 September, 29 September and 6 October. There was a two-week pause in operations in the week of the Scottish referendum and the week after the referendum.

The total stock of gilts outstanding, in terms of the amount paid to sellers, was £375 billion, of which £80.8 billion of purchases were made in the 3–7 years residual maturity range, £138.0 billion in the 7–15 years residual maturity range and £156.1 billion with a residual maturity of greater than 15 years (**Chart 14**).

Chart 14 Cumulative gilt purchases by maturity[a][b]



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

(1) Further details are available at www.bankofengland.co.uk/markets/Pages/money/ctrf/default.aspx.
(2) This is in accordance with the announcement on 2 December 2014. Further details are available at www.bankofengland.co.uk/publications/Pages/news/2014/165.aspx.
(3) Further details are available at www.bankofengland.co.uk/markets/Pages/FLS/default.aspx.
(4) Further details are available at www.bankofengland.co.uk/markets/Pages/FLS/data.aspx.
(5) Further details are available at www.bankofengland.co.uk/markets/Documents/marketnotice140124.pdf.
(6) Further details are available at www.bankofengland.co.uk/publications/Documents/inflationreport/2014/ir14febo.pdf.

Gilt lending facility[1]

The Bank continued to offer to lend gilts held in the APF via the Debt Management Office (DMO) in return for other UK government collateral. In the three months to 30 September 2014, the daily average aggregate value of £1,693 million of gilts was lent as part of the gilt lending facility. Average daily lending in the previous quarter was £977 million.

Corporate bonds

There were no purchases of corporate bonds during the review period and future purchase or sale operations will be dependent on market demand, which the Bank will keep under review in consultation with its counterparties in the Corporate Bond Scheme.[2] The Scheme currently holds no bonds.

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.[3] No purchases were made during the review period.

(1) 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; www.bankofengland.co.uk/publications/Documents/quarterlybulletin/mo10nov.pdf.
(2) More information can be found in the Market Notice at www.bankofengland.co.uk/markets/Documents/marketnotice130627.pdf.
(3) The SCP facility is described in more detail in the Market Notice available at www.bankofengland.co.uk/markets/Documents/marketnotice120801.pdf.

Summaries of speeches and working papers

Bank of England speeches

A short summary of speeches and *ad hoc* papers made by Bank personnel since 1 September 2014 are listed below.

The Bank of England's perspective on CCP risk management, recovery and resolution arrangements

David Bailey, Director, Financial Market Infrastructure, November 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech781.pdf

At a Eurex conference in London, David Bailey noted the increasing importance of central counterparties (CCPs), due to evolving regulatory and legislative initiatives, and welcomed international progress to enhance regulatory standards and the resilience of centrally cleared markets.

He also stressed that international standards can only be viewed as a 'baseline', that should evolve to keep pace with market developments. In particular, David emphasised the importance of progressing European legislation on CCP recovery and resolution. He noted that this legislation should provide CCPs and their domestic resolution authorities with flexible and well-considered toolkits to enable them to ensure the continuity of critical clearing services in an extreme event, without recourse to taxpayer funds.

The use of business intelligence in monetary policy

Ian McCafferty, Monetary Policy Committee member, November 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech780.pdf

In this speech, Ian McCafferty argued that to be in the best position to make informed policy decisions it is necessary to supplement official economic data with business surveys, both intelligence collected by the Bank's regional agents and external surveys. Ian outlined the benefits of survey data. They provide a timely source of information which in some instances can give a more helpful steer than early vintages of official data. Surveys are also vital in filling in the gaps which official data are not able to cover, such as estimates of spare capacity. And 'softer' survey questions about intentions, confidence and expectations can help shape the policy narrative. To make the most of survey data, it is important for policymakers to have a thorough understanding of the way in which the survey is compiled and to recognise that some information is more relevant at certain points in the economic cycle, such as those questions which provide advance warning of potential downturns or upturns in economic activity.

What is the right amount of guidance? The experience of the Bank of England with forward guidance

David Miles, Monetary Policy Committee member, November 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech779.pdf

At a speech to De Nederlandsche Bank's Annual Research Conference on 13 November 2014, Professor Miles asked what sort of guidance on future monetary policy by central banks is most useful. Drawing on analysis he had presented recently at a speech at the London School of Economics, he argued that a commitment to a particular path for interest rates is very unlikely to be desirable.

Nonetheless, giving some assessment of the broad likelihood of interest rates following different paths is likely to be helpful, particularly in situations in which past action and communication is not enough to describe new trade-offs in an unusual environment. But he argued that it was far from clear that making an explicit estimate of the probabilities of interest rates following particular paths was really helpful. It risks giving a false sense of precision as estimating probabilities is deeply problematic.

Why we need a leverage ratio, and how bank boards might take charge

Martin Taylor, Financial Policy Committee member, November 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech778.pdf

Martin Taylor addressed two subjects: the role of the leverage ratio in the United Kingdom's capital framework for banks, and the corporate governance of financial institutions, in particular the overdevelopment of board committees.

Martin considered four questions in relation to the leverage ratio: why it was needed in addition to risk-weighted capital ratios; how it should be calibrated; why the Financial Policy Committee's proposals were not simpler; and what type of capital was appropriate to count towards the leverage ratio.

On the corporate governance of banks, Martin observed that, in response to governance failures of the past, and in order to operate more efficiently, boards of directors had increasingly delegated important decisions to board committees. In his view, there were some matters that the board of a bank must have a collective understanding of and take collective

responsibility for, in particular those related to risk, remuneration, audit and capital allocation.

Financial 'deglobalization'?: capital flows, banks, and the Beatles

Kristin Forbes, Monetary Policy Committee member, November 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech777.pdf

Speaking at Queen Mary University, Kristin Forbes examined the substantial declines in international capital flows and financial exposures since the global financial crisis both for the United Kingdom and for the world as a whole. She showed that banking flows have contributed most to the decline, resulting in a major contraction of the international banking network. In particular, reduced bank flows into and out of the United Kingdom have played a greater part in the observed banking deglobalization than any other banking system. Kristin found that bank flows are no longer primarily driven by global risk and economic uncertainty as they were before the financial crisis. She offered a number of possible explanations for their recent behaviour, ranging from higher informational costs of doing business abroad and weakness in bank balance sheets to recent regulatory changes and the conditions of official support packages for banks. In conclusion, she discussed the possible implications of banking deglobalization for monetary policy in the United Kingdom, highlighting that it could reduce vulnerability to external conditions but increase vulnerability to domestic conditions, as well as make the lending channel of monetary policy more effective.

The future of financial reform

Mark Carney, Governor, November 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech775.pdf

Speaking in the immediate aftermath of the Brisbane G20 Leaders' Summit, the Governor noted that the Summit had marked the intended, positive result of the G20/FSB reform agenda — the point at which the post-crisis system of prudential regulation had been settled. That system, built on safer, simpler and fairer foundations than the one that led to disaster was able to serve households and businesses right across the globe.

But that did not mean that the job of financial reform was completed. Implementation needed to follow agreement, based on three pillars. The first, diversity of market-based as well as bank-based finance, would support a wide variety of investment necessary to create jobs. The second, trust, would allow the financial system to retain its social licence to support the real economy in innovative and efficient ways. And third, openness, to ensure the best allocation of scarce capital.

The next phase of reform would give businesses and households the confidence that finance, far from being a threat to them, was there to serve them in their work to deliver prosperity. Reform would stop only when industry and society were content and finance justifiably proud.

Central bank psychology

Andrew Haldane, Executive Director and Chief Economist, November 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech776.pdf

In a speech, Andrew Haldane considered how psychological biases can affect policymaking and asked what can be done to counteract these effects.

Over recent years, there has been a huge amount of research on how human decision-making is affected by various cognitive biases. Behavioural biases afflict us all, and central banks are no exception. Andrew examined the challenges posed by various cognitive ticks, and argued that the Bank's new policy framework is part of the response to these challenges. But still more could be done.

As part of its Strategic Plan, the Bank will begin to carry out, and publish externally, research covering the whole range of policy issues it faces. Through a set of new publications, this research will as often challenge as support the prevailing policy orthodoxy on certain key issues, proving further support against these biases.

Regulatory reform, its possible market consequences and the case of securities financing

David Rule, Executive Director, Prudential Policy, November 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech774.pdf

In this speech, David Rule argued that regulators should closely follow how banks adjust to the set of regulatory reforms that are being implemented, to understand their overall effect on banks and financial stability, and to identify any unintended consequences. The changes and overall increase in regulatory requirements will lead to both 'income' effects and 'substitution' effects. Adjustments might take place from banks to non-banks, between banks, and within the scope of banks' business models. Regulators will need to follow such reallocations and be alert to pure regulatory arbitrage and to undesirable shifts in risk allocation.

One example of a market where tougher regulation was needed but might have wider consequences is securities financing. This market plays some important economic functions but has proven fragile because of excessive leverage and maturity transformation. Regulators have taken steps to make this market more resilient in stresses. The flipside may be less leverage, maturity transformation and lower inventories in normal times.

Managing global finance as a system

Andrew Haldane, Executive Director and Chief Economist, October 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech772.pdf

In his Maxwell Fry Annual Global Finance Lecture, Andrew Haldane described how the international monetary and financial system has undergone a mini-revolution in the space of a generation as a result of financial globalisation.

For much of the 20th century, global finance was more of a patchwork than a network. But the picture has changed spectacularly over the past 30 years. Today, global finance is a well-connected network, a genuine system. The crisis also revealed that the safety of individual banks was neither a necessary nor sufficient condition for systemic stability.

Despite the benefits, financial globalisation also brings many risks to financial stability. This naturally begs the question — what might be done to improve the resilience of the international monetary system? Andrew discussed four areas where progress might realistically be made in developing this new architecture: financial surveillance; debt structures; macroprudential policies; and multilateral financing.

Monetary policy one year on

Sir Jon Cunliffe, Deputy Governor, October 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech773.pdf

In a speech to the Cambridge Society for Economic Pluralism, Jon Cunliffe reviewed developments in the UK economy during his first year in office. The burst of pent-up demand that propelled the initial recovery through the second half of last year was stronger and lasted longer than initially expected. Combined with weak productivity growth, that had led to record growth in employment. The big surprise for the Monetary Policy Committee, however, had been over the extent to which employment has been able to grow without generating more inflationary pressure. Labour supply appeared to be behaving differently to the past. Together with the constraints that came with Bank Rate remaining close to the effective lower bound, that gave reason to be cautious about moving to tighten monetary policy on the basis of falling unemployment alone, before clearer signs of strength in pay growth. Softness in the pay and inflation data, together with the weak external environment, suggested that the current degree of monetary stimulus could be maintained for a longer period than previously thought.

Making markets fair and effective

Minouche Shafik, Deputy Governor, October 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech771.pdf

In a speech at the London School of Economics, Minouche Shafik set out how the Fair and Effective Markets Review intends to go about identifying the key recommendations it will make for Fixed Income, Currency and Commodities (FICC) markets in June 2015. That review is currently seeking responses to its consultation document from market participants, international policymakers, the academic community and the general public.

Dr Shafik outlined why the FICC markets matter for us all — through business transactions, public finances and personal saving decisions. She also outlined the outrageous cases of misconduct that have come to light in recent years, and some of the features of the FICC markets which may have facilitated this.

Many changes are already under way, and Dr Shafik emphasised that the key question of the review will be whether or not these will be enough. She also outlined some potential further ideas for making markets fair and effective, including changes to: market microstructure; competition and market discipline; benchmarks; standards of market practice; responsibility, governance and incentives; and surveillance and penalties.

Monetary policy, asset prices and distribution

Ben Broadbent, Deputy Governor, October 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech770.pdf

Speaking to the Society of Business Economists, Ben Broadbent discussed the reasons for the 'remorselessly downwards' trend in global interest rates over the past 20 years, and the implications for asset prices and inequality. He cautioned against attempts to 'explain' low interest rates solely by reference to the actions of central banks. He argued that central banks have instead been accommodating a deeper downward trend in the 'natural' rate of interest and that, had they not done so, policy would have been too tight and inflation and output too low.

Broadbent looked at several real economic changes that may have influenced interest rates, along with the implications for movements in asset prices. He found that greater uncertainty about, and a downward skew to, global growth expectations might help to explain the divergence between equity and bond yields that had opened up since 2001. He pointed out that, despite this divergence, it is not obvious that there had been any implication for the broad distribution of income between capital and labour.

The future path of natural real rates is, Broadbent said, 'anyone's guess'. That said, his instinct is to set more store by the very long-term average for both productivity growth, and real interest rates, than the more recent trends.

PRA Solvency II Conference: countdown to implementation

David Rule, Executive Director, Prudential Policy, October 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech768.pdf

Speaking at a Prudential Regulation Authority (PRA) Solvency II conference for insurance firms in London, David Rule discussed the importance of this EU policy framework. He started by highlighting the significance of the insurance sector to the financial system and how Solvency II will support the furthering of the PRA's primary objectives. Enhanced group supervision will help deliver stability in the system through improving visibility of risks in interconnectedness. Stability can also be enhanced through diversification of funding sources, specifically by the growth in investment from insurers in the real economy. Revitalisation of securitisation markets with improved transparency, simplicity and consistency can further contribute to improved growth. In setting the scene for the conference he stressed the shift in focus from policy development to proper implementation, and specifically the rigour with which the Bank will assess internal models and their use in firms, emphasising that inadequate models would not be approved. Looking forward, he concluded, the Bank will seek to align developments in the international landscape on policies for global systemically important insurers with the positive steps made in Europe with Solvency II.

PRA Solvency II Conference: countdown to implementation

Paul Fisher, Deputy Head of the PRA and Executive Director, Insurance Supervision, October 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech767.pdf

Paul Fisher stated that Solvency II was one of the Bank's key priorities and that the PRA is taking a proportionate approach to implementation and would not 'gold plate' the Directive. He emphasised that the amount of work still required was significant and the challenge should not be underestimated. He clarified that internal model success was dependant on firms meeting the Solvency II Tests and Standards and therefore applications should be of a high standard and submitted in good time. He reminded firms that the PRA would not approve inadequate or opaque models. To meet regulatory reporting requirements, he stated the PRA is building new IT and data collection systems which would be ready to receive information from firms from June 2015. Finally, he made firms aware that the PRA was developing its thinking on other key aspects of the Directive including standard formula and other approvals.

Regulatory reform and returns in banking

Sir Jon Cunliffe, Deputy Governor, October 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech769.pdf

In a Chatham House conference, Jon Cunliffe set out three major developments in the regulatory landscape since the financial crisis and considered the commercial implications for the banking industry. First, macroprudential 'machinery', such as the Financial Policy Committee, had been set up to monitor and address risks to the financial system as a whole. Second, the international governance framework around the regulatory landscape had been strengthened, through the creation of the Financial Stability Board reporting to G20 leaders. Third, there had been a shift in prudential supervision to focus more intensively on firms that pose the greatest risks to financial stability. The new regulatory and resolution regimes that followed had resulted in a marked increase in the amount of capital firms were required to hold and, for the larger firms, a rolling back of the implicit subsidy from the taxpayer. These changes had in turn reduced banks' return on assets and equity. Banks' pay bills also appeared to be taking a larger share of a smaller pie, relative to shareholders. With lower levels of leverage, it was unlikely that returns on equity will return to pre-crisis levels, suggesting that pay bills might have further to adjust. Trying to bolster returns by taking excessive risk or evading regulation would not, Jon thought, be tolerated in the new world.

Twin peaks

Andrew Haldane, Executive Director and Chief Economist, October 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech764.pdf

In a speech, Andrew Haldane highlighted that there are plenty of reasons to be both *cheerful* and *fearful*. Growth in the United Kingdom was running at an annual rate of over 3%, yet the cumulative fall in real wages since the crisis was the worst since at least the mid-1800s.

This leaves a macroeconomic puzzle. Is the United Kingdom experiencing a fairly conventional recovery, if perhaps slower than usual? Or instead a more protracted period of sub-par growth — what some have called 'secular stagnation'?

It could be that the answer is both. Indeed, the speech outlined how recent developments in the labour market could be consistent with that interpretation. The UK economy appears to be twin-peaked.

Andrew noted that recent evidence, in the United Kingdom and globally, has shifted his probability distribution for the economic outlook towards the lower tail — put in plainer English, he is gloomier.

Andrew Bailey's speech at the Lord Mayor's Banquet, London

Andrew Bailey, Deputy Governor, October 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech763.pdf

Andrew noted that there had been two phases to the financial crisis — the first was a prudential phase, the second has revealed past misconduct.

The PRA was focused on four key areas:

- The capital framework for banks. This had several planks including assessing firms' models and stress testing. It would be augmented by the introduction of a global framework for total loss-absorbing capacity — the single most important objective in ending 'too big to fail'.
- The introduction of Solvency II. This represented a step change in the use of models and the PRA would be providing robust challenge on model applications.
- The prudential effects of conduct risk which, at its most serious, could threaten the safety and soundness of firms. This required, among other things, better international co-ordination between authorities.
- Getting the incentives right. It was important that the most senior people had their remuneration deferred for a meaningful period and that there was a presumption of senior management responsibility.

What to do when we don't know: policymaking when spare capacity is uncertain

Martin Weale, Monetary Policy Committee member, October 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech762.pdf

In the annual JSG Wilson Lecture, at the University of Hull, Martin explored what he calls 'the practical problem' of setting policy while being uncertain about the margin of spare capacity in the economy, and thus the implications of future economic growth for future inflationary pressures.

Using modelling techniques, Martin suggested ways in which policymakers could adapt to this uncertainty, and in particular how there can be benefits to setting policy with reference to the change in, rather than the level of, the margin of spare capacity. This framework also avoids the need to know the 'normal' rate of interest.

Turning to the practical implications of his analysis for current policymaking, Martin argued that given the unusually rapid fall in unemployment over the past year, it is clear that the margin of excess capacity in the labour market is being used up rapidly, and 'all logic suggests that that ought to lead to an increase in inflationary pressures over the two to three-year horizon which concerns the Committee'.

Regulatory work under way and lessons learned

Mark Carney, Governor, October 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech765.pdf

The Governor began by noting that, while all recognised that future crises could not be ruled out, the financial reforms made in the previous six years, along with a stronger framework for global co-operation, meant that the financial system was in a better position to face new risks.

Where banking systems had raised capital and restored trust in their creditworthiness, access to credit had returned. Publicly provided insurance was being removed from the system as the 'too big to fail' problem was addressed and the public subsidy for globally systemic banks eliminated.

Market forces were being restored. The system was more transparent. It was clear who bore risk.

And the scope for arbitraging new regulation had been reduced through a global approach to reform that had established common standards and encompassed shadow banking.

These G20/FSB proposals, to be presented at the G20 Leaders' Summit in Brisbane, would mark an important milestone in the financial reform agenda. But the process of reform was not over. It was essential to continue managing the system effectively in the face of new risks, in order to deliver a financial system that could support strong, sustainable, and balanced growth around the world.

Microprudential, macroprudential and monetary policy: conflict, compromise or co-ordination?

Paul Fisher, Deputy Head of the PRA; Executive Director, Supervisory Risk Specialists and Regulatory Operations; Executive Director, Insurance Supervision, October 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech759.pdf

In his speech at Richmond University, Paul Fisher argued that there is no reason that the three committees of the Bank of England — the Monetary Policy Committee (MPC), the Financial Policy Committee (FPC) and the PRA Board — should inevitably be in conflict due to their differing objectives.

Paul asked a series of questions designed to examine whether the MPC, FPC and PRA Board have been set the right targets, and whether they are achievable.

Paul explained that there is no inherent conflict to achieving the triple objective of CPI inflation at 2%, financial stability, and safety and soundness of firms at the same time. He said 'even though the different policy objectives can be achieved simultaneously, that does not mean that each committee can ignore the others'. He continued 'in practice independence is inevitably partial: each policy tool is likely to affect all the objectives, albeit in different degrees… the choices of one committee will affect the choices of the others'.

Co-operation between the committees is needed to meet all three objectives. One aspect of this co-operation is a common understanding of the economy. This is important as the committees could set inconsistent policies if they had different views about the state of the economy or just used different economic models. Paul noted that 'coherence doesn't always mean agreement'. He highlighted that the appointment of independent members to the policy committees is intended to ensure challenge and stop 'groupthink'. Paul explained that the likelihood of dissent across committees is mitigated as the Bank of England has 'a collective institutional need to make the whole framework function in the best interests of the UK economy'.

The economic impact of sterling's recent moves: more than a midsummer night's dream

Kristin Forbes, Monetary Policy Committee member, October 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech760.pdf

Speaking at an event organised by 100 Women in Hedge Funds, Kristin Forbes discussed the impact of the recent appreciation in sterling on the UK economy. Kristin started by highlighting that sterling's effective exchange rate had risen by 14.5% from March 2013 to July 2014. She noted that the sterling value of profits from overseas operations had fallen as a result of the appreciation. She then went on to examine the implications of the recent appreciation for UK exports. Kristin showed that the negative impact on real export volumes is probably small compared to the positive impact of observed external demand growth over the period where sterling appreciated. She then presented estimates of what the appreciation might mean for growth and unemployment, concluding that the impact was meaningful but small in relation to the recent recovery in domestic growth. Next, Kristin examined the effects on import prices and overall inflation in the United Kingdom, estimating that CPI inflation might have been up to 0.8 percentage points higher than its current level in the absence of the appreciation. But looking at a range of measures of domestic price pressures, she found little evidence of underlying price pressures. She concluded that these conflicting messages on inflation make it critically important to monitor measures of prospective inflation to determine the appropriate path for monetary policy.

Mensch tracht, und Gott lacht: giving guidance on future monetary policy

David Miles, Monetary Policy Committee member, September 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech758.pdf

In a speech at the London School of Economics, David Miles asked what sort of central bank guidance on monetary policy is most useful.

A commitment to a particular path for interest rates is very unlikely to be desirable. But giving some assessment of the likelihood of interest rates following different paths is likely to be helpful, particularly in situations in which past action and communication is not enough to describe new trade-offs in an unusual environment. Constructing an explicit probability distribution for the central bank's own policy rate, which reliably reflects how policy is made and gets across an easy-to-understand message, is a major challenge.

David concluded that more qualitative forms of guidance, such as: *interest rate rises will probably be gradual and likely to be to a level below the old normal*, might be just as useful — and possibly less misleading — than an explicit fan chart for interest rates.

Putting the right ideas into practice

Mark Carney, Governor, September 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech757.pdf

Speaking in Newport, the Governor began by noting that, as regulator, the Bank was tasked with ensuring the safety and soundness of the United Kingdom's insurance companies and the protection of their policyholders. Recognising the importance of the insurance sector to the economy, the Bank was putting the right ideas to work to preserve its positive role.

The Governor highlighted three points. First, tailored capital standards that promoted a level playing field, without impeding the provision of long-term finance to the real economy. Second, a framework for the insurance profession to hold the right people to account. Third, global standards for globally systemic insurers, to increase systemic resilience, preventing spillovers from the failure of an insurer to the wider economy.

All three ideas were needed now, in practice. As these reforms were implemented, the regulatory approach needed to be regularly reviewed, and adjusted if necessary to take into account evolving conditions. Robust interaction with the industry, including with the Institute and Faculty of Actuaries, was essential to ensure the right ideas could be put into action now, and in the future.

In giving, how much do we receive? The social value of volunteering

Andrew Haldane, Executive Director and Chief Economist, September 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech756.pdf

In a speech to the Society of Business Economists, Andrew Haldane examined volunteering and its contribution to the economy and wider society.

Volunteering is an important part of the United Kingdom's social fabric. There are around 15 million people who volunteer through formal groups or organisations in the United Kingdom, equivalent to around 1.25 million full-time employees. All in all, volunteers could be giving as much as 4.4 billion hours per year. The lecture considered several different ways of measuring the value generated from volunteering.

Overall, he found that the contribution of volunteering to UK society is likely to be huge, making it one of the most important sectors in society — but also one that is largely underappreciated. Given this, Andrew asked whether there are policy 'nudges' that might be available to help lower frictions, or sharpen incentives, in ways which could enhance the value already being created.

Remarks to the BBA Strategy Group

Donald Kohn, Financial Policy Committee member, September 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech755.pdf

Speaking to the British Bankers' Association (BBA) Strategy Group, Donald Kohn explained the objectives of the FPC and its approach to building resilience in the financial system and enhancing transparency in banking. He discussed the shared interest of the FPC and the BBA in building a safer banking system and outlined how the two bodies could work co-operatively together. For the FPC's part, Kohn expected the Committee to require more bank capital at every stage of the business cycle, set diversified measures of capital adequacy, establish limits on maturity transformation through required liquidity ratios and utilise a narrower set of measures to target specific problems. Kohn also explained that the BBA could assist the FPC in achieving its goals by identifying risks and vulnerabilities of the system, and assessing the cost and effectiveness of macroprudential policy. One area where the FPC and BBA have already been working together is in enhancing transparency of firms' approaches to risks management, and implementing the FPC's recommendations around disclosure. Finally, Kohn discussed how the FPC can work with banks to manage risks that could arise as policymakers around the world begin to prepare their exit from unconventional monetary policy.

Mark Carney's speech at the Trades Union Congress

Mark Carney, Governor, September 2014.

www.bankofengland.co.uk/publications/Documents/speeches/2014/speech754.pdf

The Governor began by noting some salient differences in how the labour markets of major economies had responded to the crisis. In the United States and euro area, there was a clear danger of a misplaced if not lost generation of workers. Britain's labour force and trade unions deserved great credit for ensuring that this risk was much lower in the United Kingdom.

By maintaining price and financial stability, the Bank was putting in place the foundations for sustainable job creation and income growth. The MPC had used the flexibility in its remit to return inflation to target over a longer period than usual in order to support sustainable jobs and growth.

As the margin of wasteful labour market slack continued to narrow, the Bank expected wages to pick up slightly faster than productivity, and unit labour cost growth to increase, consistent with meeting the inflation target. The Bank's forecasts showed that, if interest rates were to follow the path expected by markets, inflation would settle at 2% by the end of the forecast period and a further 1.2 million jobs would have been created.

But monetary policy could not do it alone. Others — including trade unions, government and businesses — were crucial to delivering long-term productivity, so that the British people got the pay rise they deserved.

Exploiting the monthly data flow in structural forecasting

Summary of Working Paper No. 509 Domenico Giannone, Francesca Monti and Lucrezia Reichlin

Central bankers typically place their forecasts centre-stage in the communications. The forecast is presented as a guide to future developments in the economy, but also as a means of communicating policy. Thus statistical models that might forecast well but have no economic interpretation are insufficient to meet the policy explanation task. Yet to deliver accurate predictions, especially in the short term, it is vital that the forecast incorporates a range — often a very wide range — of timely information.

Consequently the preparation of a forecast is a subtle process of aggregation of knowledge of how the economy and policy channels work and detailed data. This process involves the combination of formal models which aid understanding, expert judgement and statistical data analysis. In this paper we address a particular part of this process and analyse the connection between two important tools in the forecasting process: the structural quarterly model and the daily monitoring of monthly data releases for the assessment of the current state of the economy.

The structural quarterly model is often a dynamic stochastic general equilibrium (DSGE) model which looks at the joint evolution of the key relations in the economy as it is buffeted by random (stochastic) shocks and is deeply driven by economic theory. It is essential when constructing scenarios based on different policy paths or other conditioning assumptions; that is, for policy analysis. The objective of this is not to obtain a simple forecast, but rather to analyse the implications of policy alternatives. Moreover, from structural models one can recover quantities that are not directly observable from the data but that are often relevant for the understanding of the stance of policy, such as the natural rate of interest or potential output. Although this part of the analysis is essential for guiding the policy discussion, any decision-maker needs to have, in addition, a system in place for understanding the evolution of the current state of the economy. Such a system involves the analysis of many different items of data, including surveys or conjunctural leading indicators which are published early in the quarter, before the release of the quarterly national accounts data that the DSGE model is largely designed to explain, and can provide a timely signal on quantities of key interest such as GDP or employment. For this function, the typical structural model is of no use since it is not designed to capture realistic features of the data flow: a non-synchronous calendar of publications, mixed frequency (meaning a mixture of quarterly, monthly or even daily data), and potentially a very large dimension, with perhaps hundreds of data series. But recent work has developed a statistical framework for dealing with these problems, allowing continuous updates of the estimate of the current state of the economy in relation to the real-time data flow. This process is sometimes labelled nowcasting, the point being it is helpful in very short-run forecasts.

This paper proposes a framework that bridges a structural quarterly model and a statistical model for nowcasting. This is particularly relevant for the conduct of monetary policy today when, with the implementation of forward guidance, an increasing emphasis has been placed on the definition and communication of nearer-term policy in relation to the evolution of the state of the economy. With our methodology it is possible to exploit the real data flow in a DSGE model, using the most recent data for both the variables that appear in the model and other series that are not explicitly modelled, but that might be informative about the current state of the economy. Because this information is processed through the structural model, we can update the policy analysis at each new data release and assess the impact of the new piece of information on our scenarios and on our estimates of policy-relevant and inherently model-dependent concepts, such as the equilibrium real interest rate or potential output.

We apply our methodology to a medium-scale DSGE model and to a sizable number of timely macroeconomics series for the United States and we show that we obtain point and density nowcasts that are much more accurate than those obtained with the quarterly model, and comparable with a traditionally tough benchmark, such as the Survey of Professional Forecasters' nowcasts.

Institutional investor portfolio allocation, quantitative easing and the global financial crisis

Summary of Working Paper No. 510 Michael A S Joyce, Zhuoshi Liu and Ian Tonks

In its efforts to loosen monetary conditions in March 2009 in response to the effects of the deepening financial crisis on the inflation outlook, the Bank of England's Monetary Policy Committee (MPC) reduced policy rates to their effective lower bound of 0.5% and began a programme of large-scale purchases of financial assets financed through the creation of central bank reserves, so-called quantitative easing (QE).

While the objectives of the QE policy were clear, there has been more debate over how the policy was expected to work. The MPC has often emphasised the portfolio balance channel as a key element in the transmission of the Bank's asset purchases to the rest of the economy during the financial crisis. According to this mechanism, purchases of financial assets from the non-bank private sector (eg insurance companies and pension funds) financed by central bank money initially increase broad money holdings and push up asset prices, as those who have sold assets to the central bank rebalance their portfolios into riskier assets. This then stimulates expenditure by increasing wealth and lowering borrowing costs for households and companies.

Despite the emphasis put on this channel by monetary policy makers, the role of portfolio balance effects in theory remains rather controversial and the empirical evidence in its support rather indirect. Most empirical research on the topic has inferred the importance of this channel from the behaviour of government bond prices/yields and other asset prices, rather than from direct evidence on the behaviour of investors. Although discussions with market contacts have also suggested some asset reallocation occurred in response to QE, particularly during the first phase of asset purchases between March 2009 and January 2010, there has been little hard evidence on the behaviour of insurance companies and pension funds, the group of investors who the Bank specifically targeted by mainly purchasing medium to long-term UK government bonds (one of the main assets held by these institutions).

The aim of this work is to try to fill this gap. We examine the behaviour of institutional investors, ie insurance companies (particularly life companies) and pension funds, both before and during the crisis and whether their portfolio allocation behaviour is consistent with portfolio balance effects. If QE has partly worked through a portfolio balance channel then we would expect that institutional investors will have reduced their holdings of UK government bonds (gilts) below what they would otherwise have been and that they will have increased their demand for riskier assets. This of course raises the difficult issue of inferring what would have happened in the absence of QE (the 'counterfactual').

In order to generate a plausible counterfactual, it is clearly important to allow for a range of other factors that may have been relevant in driving portfolio allocation. At the same time, allowing for the influence of other factors that may have been influenced by QE (eg domestic financial conditions) may lead to understating the potential effects of the policy (a switch into riskier assets will be attributed to improved financial conditions rather than QE, even though the policy may have been behind the improvement). We address this issue by allowing only for factors that influence portfolio allocation, but at the same time are unaffected by the Bank's purchases. These factors include gilt issuance by the Debt Management Office and foreign financial variables. To measure the impact of QE, we use in and out-of-sample model-based forecasts to construct counterfactuals of what would have happened if the policy had not been implemented.

Our analysis of a range of data sources, including national accounts net investment data and micro-level data on individual life insurance companies and pension funds, is consistent with QE having led institutional investors to shift their portfolios away from gilts towards corporate bonds relative to the counterfactual. Analysis of the microdata shows that the switch into corporate bonds apparent in the sectoral data is reflected in remarkably similar behaviour across different types of life insurance companies and pension schemes, but in the case of insurers (who appear to exhibit more heterogeneity) the switch away from gilts was more pronounced for companies that showed less risk aversion (ie were larger than average and more heavily weighted in equities), were under more financial constraints (ie had a lower-than-average ratio of business premiums to assets) and those less constrained on average by their liabilities (ie with a larger share of assets linked directly to liabilities). For pension funds, the switch out of gilts was more pronounced for those funds that were better funded.

Overall the balance of our evidence is consistent with the hypothesis that the Bank of England's QE policy resulted in some portfolio rebalancing behaviour by institutional investors, who appear to have reduced their gilt holdings and reinvested some of the proceeds into corporate bonds relative to the counterfactual. But it appears that portfolio rebalancing was limited to corporate bonds, with most of the evidence suggesting that institutional investors moved out of equities during the period of QE purchases. Of course, this does not necessarily imply equity prices were not supported by portfolio reallocation behaviour, still less from QE, as our analysis only considers insurers and pension funds and we do not investigate the behaviour of other financial institutions; something we leave for further work.

QE and the bank lending channel in the United Kingdom

Summary of Working Paper No. 511 Nick Butt, Rohan Churm, Michael McMahon, Arpad Morotz and Jochen Schanz

In March 2009, the Bank of England's Monetary Policy Committee (MPC) voted to commence a programme of asset (predominantly gilt) purchases, commonly referred to as quantitative easing (QE). Following subsequent rounds of purchases the stock of asset purchases reached £375 billion by October 2012. Faced with a likely deep recession and the risk of deflation, this policy was intended to boost GDP and inflation. The MPC thought that this would primarily happen by QE reducing gilt yields and boosting the price of a range of assets. That view drew on the monetary economics literature, which suggests that when sellers of gilts — who were primarily other financial corporations (OFCs) such as pension funds, insurance companies and asset managers — receive deposits, they would wish to rebalance their portfolios in to riskier assets, due to money and securities not being close substitutes. There is a broad range of evidence that suggests that QE did reduce gilt yields and boost other asset prices. The economics literature also suggests that such expansionary monetary policy may lead to a shift in banks' willingness to lend, via a 'bank lending channel'. At the time QE was launched the MPC were not expecting or relying upon a large bank lending channel due, in part, to the pressures on banks to decrease the size of their balance sheets. In this paper we test whether QE did in fact provide a boost to bank lending.

We show, using a simple framework, that changes in banks' liabilities resulting from QE are likely to lie at the heart of any bank lending channel. The key insight is that a shock that boosts banks' OFC deposit funding can lead to a greater willingness of banks to lend, as these deposits offer a cheaper source of financing than other sources of funding. But if the variability, or 'flightiness', of these deposits increases then banks are less likely to increase their lending at a given price, as cheaper funding today may have to be replaced with more expensive funding tomorrow.

We use this framework to inform our empirical analysis, which makes use of a data set available to researchers at the Bank of England. It combines balance sheet, regulatory and market operations data for individual banking groups. This allows a descriptive review of banks' balance sheets over the QE period. We find that banks that took part in gilt sales saw increases in reserves and OFC deposit positions but that only a portion of the proceeds remained at the end of the month. Indeed, we also show that the variability of banks' deposit and reserve positions increased during QE, which could be consistent with the portfolio rebalancing channel of QE. These findings help inform our empirical tests of the bank lending channel and our interpretation of them.

A key challenge for empirical work on the bank lending channel is to isolate changes in lending caused by changes in deposits, from changes in deposits caused by new lending (an endogenous variation in deposits). We attempt to address this problem using two alternative approaches. Our first approach exploits the fact that, for historical and infrastructural reasons, it is likely that not all banks are equally well placed to receive very large OFC deposits. We use historical data on the share of banks' OFC funding (relative to their balance sheet) to identify a group of banks that are most likely to have received deposits created by QE, which we call 'OFC funders'. We use this variable, along with variation in banks' OFC deposit funding to test whether there was a bank lending channel by comparing the lending response of such OFC funders to that of other banks during the QE period. Our second approach makes use of the fact that while most gilt purchases were from OFCs, these had to be settled via banks who were market makers in gilts. As these gilt sales were likely to be unrelated to banks' lending decisions, we can use data on gilt sales to remove the endogenous variation in banks' OFC deposit holdings and so test for a bank lending channel using an instrumental variables approach that controls for the interrelatedness of the bank's decision.

We find no statistically significant evidence from either approach that those banks who received increased deposits from QE lent more, all else equal. This contrasts with results in the recent Bank of England working paper, 'Quantitative easing and bank lending: a panel data approach', which used different empirical methods placing more weight on the pre-crisis relationship with deposits to show that QE may have had a statistically significant but small effect on bank lending. Our results do not preclude a bank lending channel, but if the effect were very powerful it seems unlikely there would be no evidence of it in our tests. While our results do not provide an explanation of why such a channel did not operate, our framework suggests that if QE gave rise to flighty deposits, then the traditional bank lending channel would be diminished. And our analysis suggests that QE has been associated with an increase in the variance of banks' reserves and OFC deposit positions. This is consistent with the idea that there was no bank lending channel from QE precisely because portfolio rebalancing was occurring and is therefore consistent with other studies which show that QE boosted aggregate demand and inflation. UK policymakers did not rely on QE to boost bank lending and our evidence lends support to the use of other policies, rather than QE, to attempt to improve the supply of credit.

Policy uncertainty spillovers to emerging markets — evidence from capital flows

Summary of Working Paper No. 512 Ludovic Gauvin, Cameron McLoughlin and Dennis Reinhardt

Since the end of the 'Great Moderation' and the global financial crisis, policymakers have discussed the appropriate policy mix for returning to sustainable growth. A marked feature of this discussion has been the effects of macroeconomic policy uncertainty on domestic investment decisions by firms, especially in the light of the uncertain US fiscal outlook and the ongoing euro-area crisis. At the same time, concerns regarding the impact of domestic policies on other economies — ie 'spillover effects' — feature prominently in the international policy debate. In particular, attention has focused on the spillover impacts of capital control policies, as well as the external impact of monetary policy settings in advanced countries. More recently, these two debates have been drawn together to analyse the spillover effects of advanced-country policy uncertainty to investment and output in the rest of the world.

In this paper, we examine whether such policy uncertainty spillovers have been transmitted via cross-border capital flows. Specifically, we examine whether macroeconomic policy uncertainty in the United States or the European Union (EU) spilled over to emerging market economies (EMEs) via gross portfolio equity or bond inflows.

In principle, policy uncertainty could lead to an increase or decrease in portfolio inflows to EMEs. On the one hand, a less predictable political environment would tend to hinder domestic growth prospects, decreasing the attractiveness of investing in a given country (recent evidence points to effects of policy uncertainty on domestic output and investment). Based on this we would — *ceteris paribus* — expect investors' to shift more of their investment abroad given the declined attractiveness of investing in the United States or the EU. On the other hand, higher policy uncertainty may decrease the overall size of investors' positions in relatively more risky investment funds. Since there is a strong relationship between macroeconomic policy uncertainty and the US equity risk premium, higher policy uncertainty may impact advanced-economy investors' willingness to take risk and lead to safe-haven flows (consistent with outflows out of EMEs that are often perceived as less 'safe'). In response to an investor funding shock, funds considerably change their allocations to emerging markets. Our paper can be interpreted as assessing the relative strength of these competing hypotheses for policy uncertainty shocks originating from two distinct regions and distinguishing between bond and equity inflows.

We find — using first a linear regression framework — that increases in policy uncertainty in the United States tend to significantly reduce both bond and equity inflows into EMEs. Conversely, increases in EU policy uncertainty tend to have different effects on equity versus bond flows into EMEs: bond inflows into EMEs decrease, but equity flows to EMEs increase in response to increased EU policy uncertainty. This is consistent with the hypothesis that shocks to US policy uncertainty are associated with safe-haven equity flows out of EMEs whereas the reduced attractiveness of investing in the EU following shocks to EU policy uncertainty appear to outweigh any safe-haven equity flows out of EMEs.

Non-linearities play, however, an important role in the size and direction of spillover effects. First, we provide evidence for two structural breaks in the relationship between changes in policy uncertainty and capital flows. The first break coincides with the first large increases in the cost of insuring against mortgages of lower credit ratings (BBB- and BBB) in the United States, providing evidence that the impact of the coming financial crisis was felt in portfolio flows slightly before the onset of funding illiquidity in the interbank market. The second break occurs in November/December 2010, coinciding with a significant expansion of QE2 by the US Federal Reserve in November 2010.

The level of global risk performs best in explaining non-linearities. Increases in EU policy uncertainty have a significantly negative impact on bond inflows only in the high global risk regime and, pointing into the same direction, the spillover impact of EU policy uncertainty on equity inflows is less positive in the high global risk regime than the low global risk regime. Global risk (proxied by the VIX index in our baseline) appears therefore not only as an important determinant of capital flows on its own, but it also determines how other push/pull factors (including policy uncertainty) impact portfolio flows. Turning to domestic factors, we find that the impact of policy uncertainty on bond inflows does not depend on domestic variables: changes to policy uncertainty have for example the same impact on bond inflows independent of a country's level of sovereign risk or equity market returns. Conversely, the level of country-specific sovereign risk (as proxied by credit default swap spreads) does determine the magnitude of policy uncertainty spillovers via equity flows. Increased EU policy uncertainty pushes portfolio equity inflows into EMEs even if global risk is high, but only into countries with low sovereign default risk.

Portfolio flows from funds based in the United States may show different reactions to EU policy uncertainty shocks than portfolio flows from funds based in the EU itself. The degree of home bias may play a crucial role. And to the extent that policy uncertainty with regard to macroeconomic policies impacts variables such as investors' wage income risk, it may also affect fund investors' willingness to buy risky assets, including assets held in EMEs. Accounting for the domicile of funds does, however, not change the finding on the positive spillover impact of EU policy uncertainty on equity flows to EMEs: we observe positive spillover effects in both the low and high global risk regime even for equity flows originating from funds domiciled in the European Union. These spillover effects are stronger for equity flows originating from funds domiciled in the United States: in the high global risk regime, flows into EMEs from US-domiciled funds increase even into EMEs with high sovereign default risk, whereas, mirroring our aggregate results, flows from Europe-domiciled funds increase only into EMEs with low sovereign default risk.

Variations in liquidity provision in real-time payment systems

Summary of Working Paper No. 513 Edward Denbee, Rodney J Garratt and Peter Zimmerman

A payment system consists of the procedures and associated computer networks used by its participants to transfer money. Sometimes called the 'plumbing' of the financial system, smoothly functioning payment systems are essential to the operation of financial markets. Large-value wholesale payment systems, such as CHAPS in the United Kingdom, are generally considered to be systemically important because of the value and nature of the financial transactions that they facilitate. On a typical business day, transactions with a total value of around £277 billion flow through CHAPS, roughly equivalent to one sixth of the United Kingdom's annual gross domestic product.

In a real-time gross settlement (RTGS) system, payments settle immediately and with finality in central bank money, providing that the paying bank has sufficient liquidity to fund the outgoing payment. But the aggregate amount of liquidity needed to fund payment obligations is often much less than gross payment flows. That is because, during the course of the day, each bank in the payment system typically makes and receives thousands of payments. Thus outgoing payments are not only funded from liquidity made available from banks' own reserves, but also from liquidity obtained from incoming payments, which can be recycled to fund a bank's own outgoing payments.

If banks were required to process payment requests as soon as they received them, then they would have little discretion over the liquidity they provide to the rest of the payment system. But this is not usually the case: with a few exceptions, banks do not usually have to process payment requests as soon as they receive them. Rather, banks may choose to delay processing payments in order to conserve liquidity and to make use of money from recycled incoming payments. They may do this because using their own liquidity has an opportunity cost in terms of foregone investment opportunities, or to help mitigate against the risk of liquidity shocks later in the day. But if too many banks withhold liquidity the payment system can fall into gridlock, preventing payments from being made, with consequences for financial stability. This is why central banks have an interest in monitoring banks' liquidity provision in order to ensure the continued smooth functioning of the payment system.

In this paper, we measure liquidity provision in two ways. First we look at the maximum net debit position that banks in the payment system reached in their accounts over the course of each day, during a historic period. The sum of these net debit positions across all banks is the total amount of liquidity that was actually used to make the day's payments. Therefore each bank's own net debit position, divided by the sum of the net debit positions of all banks, gives the share of liquidity provided by each bank. Whenever the value of a bank's payments into the system exceeds that of those it has received, the difference has to be made up either from central bank reserves, or from eligible collateral that a bank pledges intraday in order to obtain liquidity from the central bank. This means we can assume that a net debit position imposes an opportunity cost of using central bank reserves or of pledging eligible collateral, and so our first measure attempts to measure the nominal monetary cost of liquidity provision.

Our second measure examines a bank's exposure to counterparty risk. Making payments earlier can result in a greater exposure to counterparty risk, in addition to the monetary cost described above. For example, if the paying bank relies on recycled liquidity to fund future payments, then it faces the risk that its counterparty fails to recycle the liquidity back into the payment system in a timely fashion. This may happen, for example, if the counterparty has an operational problem or enters bankruptcy. We capture this using a bank's average net debit position throughout the day.

We compute our measures for CHAPS member banks using data from January 2008 to May 2010. Since some banks have a higher value of payment activity than others — and hence may reasonably be expected to provide more liquidity in absolute terms — we adjust our measures using banks' shares of payment activity. We present our aggregated results for groups of banks in two size categories. Although larger banks do provide the bulk of the liquidity in absolute terms, we find that the smaller banks almost invariably provide a larger share of liquidity to the system than their share of payments. This is true under both of our measures.

We use a Gini coefficient measure to capture variations in the liquidity cost of payments among CHAPS banks. We find that the variations significantly increase in the period surrounding the collapse of Lehman Brothers. Unobserved factors — such as differences in the nature of the payments activity — may explain some of these differences in liquidity provision. In any case, some heterogeneity between individual banks' liquidity provision and usage is inevitable, and does not necessarily imply unfairness. Since payment requests from customers often arrive outside of the control of the banks, there will be net liquidity providers and users on any given day, even if all banks process payment requests immediately. This means the patterns of liquidity provision that we observe could simply reflect the way payment requests happened to arrive.

But we would like to know when observed differences in liquidity provision are so marked that they are very unlikely to have solely been a result of external factors. We provide a method for identifying when the observed variations in liquidity provision are unlikely to have occurred by accident. The idea is to ask, given all the different permutations for how payments might have arrived, what would be a very unlikely level of liquidity provision? We answer this question by reshuffling each day's payment schedule 200 times to generate distributions for our liquidity provision measures. We then check how often actual values of these measures lie in the tails of these distributions. We find that instances where banks are in these tails occur far more frequently than we would expect to see in the absence of behavioural or structural factors.

Our methodology can be applied to any RTGS system to investigate patterns of liquidity provision at the level of individual payment system members. In the particular case of CHAPS, it should be noted that the system has undergone several structural changes since the end of our data period in May 2010 that may have led to changes in the patterns of liquidity provision.

Optimal monetary policy in the presence of human capital depreciation during unemployment

Summary of Working Paper No. 514 Lien Laureys

The recession and associated rise in unemployment has helped to revive interest in studying the trade-off that monetary policy makers face between unemployment and inflation stabilisation. But the literature has focused primarily on an environment where all workers have the same characteristics, leaving it an open question whether this trade-off is altered once worker heterogeneity is taken into account.

This paper analyses this trade-off in an environment where human capital depreciation during unemployment generates heterogeneity among *ex-ante* identical workers. This source of heterogeneity seems particularly relevant because when workers are exposed to human capital depreciation during periods of unemployment, job creation affects the unemployment pool's composition in terms of skills, and hence the economy's production potential. If aggregate shocks induce changes in the skill composition of the unemployment pool which are not desirable from a social point of view, it might be optimal to influence job creation by allowing for more or less inflation relative to an environment where human capital depreciation is not taken into account. Put differently, the presence of skill erosion during unemployment might affect the trade-off between unemployment and inflation stabilisation.

In models where the unemployed search for jobs, known as matching models, there are two market failures that lead to inefficiency. An unemployed searcher takes into account the personal costs and benefits of search but ignores the effects on others, giving rise to a congestion externality. The more an unemployed worker searches the easier it is for firms to hire which means more production on average. But at the same time it becomes harder for the other unemployed workers to find a job (there is a similar effect with vacancies). There is a point at which the costs cancel out — the Hosios condition — so in this case an economy where there are flexible prices is nevertheless optimal.

Introducing human capital depreciation during unemployment into an otherwise standard New Keynesian model incorporating sticky prices and other features including search frictions in the labour market leads to the finding that the flexible-price allocation is no longer efficient even when the Hosios condition holds. This is because it generates an additional composition externality in job creation: firms ignore how their hiring decisions affect the extent to which the unemployed workers' skills erode, and hence the output that can be produced by new matches. Consequently, it might be optimal (meaning welfare maximising) for monetary policy to deviate from strict inflation targeting (which in this simplified model means that the policymaker will always try to hit the inflation target in every period, thus mimicking the flexible price equilibrium).

In the paper a theoretical model incorporating this mechanism is calibrated using standard values so that it is broadly consistent with the benchmark US data. It emerges that optimal price inflation is no longer zero. But deviations from it are almost negligible. Consequently, the prescription for the conduct of monetary policy does not change much when it is taken into account that the unemployed are exposed to human capital depreciation: optimal monetary policy stays close to strict inflation targeting.

The Bank of England *Credit Conditions Survey*

Summary of Working Paper No. 515

Venetia Bell and Alice Pugh

Credit conditions play an important role in the transmission of monetary policy. The tightening in credit conditions during 2008 and 2009, when lending growth fell and lending rates rose, reduced the impact of the loosening in monetary policy during this period. More recently, credit conditions have relaxed as the recovery has started to take hold.

The Bank of England's *Credit Conditions Survey* (*CCS*) is a survey of UK lenders, introduced in 2007 in order to provide a better understanding of developments in credit markets. The *CCS* has subsequently been used heavily by policymakers and economic commentators. It had three main aims:

- To provide a better understanding of developments in credit markets. As an example, it could be used to help explain whether the weakness in bank lending observed after 2008 reflected a tightening in the supply of credit, or a weakening in the demand for credit.

- To collect information on all the components of the cost of a loan. In particular, the *CCS* asks lenders for information on fees, non-price terms and quantity restrictions, each of which may be important in determining loan volumes.

- To provide an early steer on developments in credit conditions, by asking about lenders' expectations of developments three months ahead.

This is the first paper to provide a detailed econometric analysis of individual banks' responses to the *CCS*. We investigate two main questions: how well do the responses track movements in the official rates and lending data, and are they useful for predicting changes in credit spreads and lending growth one quarter ahead?

The first of these questions is important because some of the information on credit conditions collected in the *CCS* is otherwise unobserved. If the survey responses correspond closely to movements in the official quantitative data, where comparable data exist, this would give us some confidence that the survey responses are also informative about these unobservable movements in credit conditions. The second question should help us to determine whether or not banks' survey expectations contain additional information (over and above existing data) which is useful for predicting changes in credit conditions in the near term.

We combine individual banks' responses from the *CCS* with bank-level microdata on lending growth and credit spreads. The use of individual bank data rather than aggregate data allows for an increased number of observations on which to perform the estimation, and allows us to relate changes in credit conditions to the same panel of banks over time.

We find that the survey responses match available official data from other sources. Over the period 2007 Q2–2013 Q2, many of the responses are significantly associated with changes in credit spreads and lending growth. But results vary by type of lending. The relationship between the responses and official data is strongest for household lending, and for headline or popular loan products. Responses relating to corporate lending are less well correlated with the official data, although this may be due in part to a lack of suitable official data with which to compare the responses.

In the second part of the analysis, we find that the *CCS* contains some predictive power for credit spreads and lending growth one quarter ahead, although results vary by type of lending. Changes in spreads on two-year fixed-rate mortgages can be partially explained by lenders' survey expectations of changes in spreads and default rates over the subsequent quarter. And survey expectations of looser credit availability and credit scoring criteria have some predictive power for lending growth in the subsequent quarter.

Overall, the results contained in this paper suggest that the *CCS* contains useful empirical information for policymakers with respect to developments in credit conditions. And while we have only investigated the relationship between the responses and quantitative data where comparable quantitative data exists, the results provide grounds for believing that the *CCS* gives a useful steer for aspects of credit conditions that are not otherwise observed. Nevertheless, the short sample period means that the results are necessarily preliminary and should therefore be treated with some caution.

Mapping the UK interbank system

Summary of Working Paper No. 516 Sam Langfield, Zijun Liu and Tomohiro Ota

This paper maps the structure of the network of interbank connectedness in the UK banking system. Using a new regulatory data set on the UK interbank exposures, we construct two networks: the exposures network is comprised of banks' counterparty credit exposures to other banks across different financial instruments; and the funding network aggregates banks' cash funding from other banks.

The exposures network and the funding network have different structures. The exposures network exhibits a 'core-periphery structure', in which core banks are densely connected to each other and peripheral banks are weakly connected to each other. The derivatives market in particular is characterised by a densely connected core, which we interpret as evidence of there being strong economies of scale associated with trading derivatives. In contrast, the funding network has less of a core-periphery structure, owing to a lower degree of connectedness among core banks in the unsecured lending and repo markets.

These structural differences between the two networks suggest that credit risk and liquidity risk propagate in the interbank system in different ways. To dig deeper, we divide banks into clusters according to the markets in which their interbank activity is concentrated. Large derivative houses dominate the system, absorbing funding from all other clusters, particularly non-UK investment banks (using repo) and smaller UK banks (using unsecured loans). A reduction in funding provided by these banks could trigger widespread liquidity shortages.

We also identify contagious links, where a bank's single counterparty exposure is greater than its capital. We identified the contagious links from core banks to many peripheral banks, implying that the isolated default of certain core banks causes multiple peripheral banks to default. However, higher-round effects from these defaults appear to be relatively limited, given that core banks tend to be relatively well diversified with respect to their bank-counterparty credit risk. We infer that core-periphery structures tend to be robust, because core banks can act as fire-stops against contagion. But such structures are also potentially fragile, because a core bank's distress could propagate throughout the network. In principle, this finding supports the application of capital surcharges on systemically important banks to build the resilience of these fire-stops in the core of the network.

Optimal contracts, aggregate risk and the financial accelerator

Summary of Working Paper No. 517 Timothy S Fuerst, Charles T Carlstrom and Matthias Paustian

Frictions in credit markets are widely known to amplify business cycles. The mechanism typically works via leverage (the ratio of debt to net worth) of the borrower. Typically, an adverse macroeconomic shock reduces the value of the assets of credit-constrained borrowers. The resulting fall in borrowers' net worth increases leverage. In turn, higher leverage makes an underlying credit friction more severe and raises credit spreads. As a consequence, demand for investment falls by more than would happen in a world without credit market frictions, depressing asset values further. This sets in motion a feedback loop between rising spreads and falling asset prices that is at the heart of the financial accelerator.

The most prominent paper incorporating the financial accelerator mechanism in a quantitative macroeconomic model was published in 1999 by Ben Bernanke, Mark Gertler and Simon Gilchrist (BGG). We revisit the debt contract they employed and highlight how the financial accelerator depends on the treatment of aggregate risk in the debt contract. BGG study the optimal financial contract in a world where borrower and lender have asymmetric information about firm-specific productivity. Lenders can only observe the return of the firm's project by paying a monitoring cost. In addition, there is aggregate macroeconomic risk that is costlessly observable by everyone. The key assumption is that the return to the lender does not depend on the realisation of aggregate risk.

In this paper, we derive the optimal financial contract and show that the return to the lender varies with the realisation of aggregate risk. Consequently, the interest rate in the optimal debt contract is contingent on aggregate macro variables, much as the coupon payment in an inflation-indexed bond is linked to the particular realisation of aggregate inflation. This 'state contingency' in the optimal contract is, however, rather complex. We show that the lender return varies with shocks to household consumption, the aggregate return on capital and the marginal value of internal funds of the borrower.

A key feature of the state-contingent debt contract is that it limits fluctuations in leverage and greatly reduces the financial accelerator. When an unexpected adverse macroeconomic shock reduces the return on borrowers' investments, the loan contract calls for a reduction in the borrowers' interest rate. As a result, fluctuations in net worth and leverage are limited and much of the adverse feedback loop described above is avoided. Ultimately, aggregate risk is shared between households (lenders) and entrepreneurs (borrowers), rather than falling predominantly on the borrowing-constrained firm as in BGG. In a model calibrated to match US data, we show that this contract implies a welfare improvement for both parties. Furthermore, amplification from credit frictions is negligible.

It is an open question to what extent actual contracts are state contingent in the way our analysis suggests. At face value, it seems that such contingency is very rare. Our primary contribution is to derive the optimal debt contract in the BGG model, not to state that financial frictions in the data cannot amplify macro shocks. But the analysis also enables us to quantify the welfare cost of financial frictions. We find that the costs of frictions are small, increasing in adjustment costs.

Appendices

Contents of recent Quarterly Bulletins

The articles that have been published recently in the *Quarterly Bulletin* are listed below. Articles from December 1960 to Winter 2003 are available on the Bank's website at:

www.bankofengland.co.uk/archive/Pages/digitalcontent/historicpubs/quarterlybulletins.aspx.

Articles from Spring 2004 onwards are available at:

www.bankofengland.co.uk/publications/Pages/quarterlybulletin/default.aspx.

Articles

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

2013 Q1
- Changes to the Bank of England
- The profile of cash transfers between the Asset Purchase Facility and Her Majesty's Treasury
- Private equity and financial stability
- Commercial property and financial stability
- The Agents' company visit scores
- The Bank of England *Bank Liabilities Survey*
- Monetary Policy Roundtable

2013 Q2
- Macroeconomic uncertainty: what is it, how can we measure it and why does it matter?
- Do inflation expectations currently pose a risk to the economy?
- Public attitudes to monetary policy
- Cross-border bank credit and global financial stability
- The Old Lady of Threadneedle Street
- Central counterparties: what are they, why do they matter and how does the Bank supervise them?
- A review of the work of the London Foreign Exchange Joint Standing Committee in 2012

2013 Q3
- Macroprudential policy at the Bank of England
- Bank capital and liquidity
- The rationale for the prudential regulation and supervision of insurers
- Recent developments in the sterling overnight money market
- Nowcasting world GDP and trade using global indicators
- The Natural Rate Hypothesis: an idea past its sell-by date
- Monetary Policy Roundtable

2013 Q4
- SME forbearance and its implications for monetary and financial stability
- Bringing down the Great Wall? Global implications of capital account liberalisation in China
- Banknotes, local currencies and central bank objectives
- Banks' disclosure and financial stability
- Understanding the MPC's forecast performance since mid-2010
- The financial position of British households: evidence from the 2013 NMG Consulting survey
- What can company data tell us about financing and investment decisions?
- Tiering in CHAPS
- The foreign exchange and over-the-counter interest rate derivatives market in the United Kingdom
- Qualitative easing: a new tool for the stabilisation of financial markets

2014 Q1
- Money in the modern economy: an introduction
- Money creation in the modern economy
- The Court of the Bank of England
- Dealing with a banking crisis: what lessons can be learned from Japan's experience?
- The role of business model analysis in the supervision of insurers
- Nowcasting UK GDP growth
- Curiosities from the vaults: a Bank miscellany
- Monetary Policy Roundtable

2014 Q2
- The UK productivity puzzle
- The Bank of England as a bank
- Credit spreads: capturing credit conditions facing households and firms
- Assessing the risk to inflation from inflation expectations
- Public attitudes to monetary policy
- How have world shocks affected the UK economy?
- How has the Liquidity Saving Mechanism reduced banks' intraday liquidity costs in CHAPS?
- Risk managing loan collateral at the Bank of England
- Sterling Monetary Framework Annual Report 2013–14
- A review of the work of the London Foreign Exchange Joint Standing Committee in 2013

2014 Q3
- Innovations in payment technologies and the emergence of digital currencies
- The economics of digital currencies
- How might macroprudential capital policy affect credit conditions?
- Household debt and spending
- Enhancing the resilience of the Bank of England's Real-Time Gross Settlement infrastructure
- Conference on Monetary and Financial Law
- Monetary Policy Roundtable
- Changes to the Bank's weekly reporting regime

2014 Q4
- Bank funding costs: what are they, what determines them and why do they matter?
- Why is the UK banking system so big and is that a problem?
- The interaction of the FPC and the MPC
- The Bank of England's approach to resolving failed institutions
- The potential impact of higher interest rates on the household sector: evidence from the 2014 NMG Consulting survey

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/research/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. 507 Estimating time-varying DSGE models using minimum distance methods (August 2014)
Liudas Giraitis, George Kapetanios, Konstantinos Theodoridis and Tony Yates

No. 508 How does credit supply respond to monetary policy and bank minimum capital requirements? (September 2014)
Shekhar Aiyar, Charles W Calomiris and Tomasz Wieladek

No. 509 Exploiting the monthly data flow in structural forecasting (September 2014)
Domenico Giannone, Francesca Monti and Lucrezia Reichlin

No. 510 Institutional investor portfolio allocation, quantitative easing and the global financial crisis (September 2014)
Michael A S Joyce, Zhuoshi Liu and Ian Tonks

No. 511 QE and the bank lending channel in the United Kingdom (September 2014)
Nick Butt, Rohan Churm, Michael McMahon, Arpad Morotz and Jochen Schanz

No. 512 Policy uncertainty spillovers to emerging markets — evidence from capital flows (September 2014)
Ludovic Gauvin, Cameron McLoughlin and Dennis Reinhardt

No. 513 Variations in liquidity provision in real-time payment systems (October 2014)
Edward Denbee, Rodney J Garratt and Peter Zimmerman

No. 514 Optimal monetary policy in the presence of human capital depreciation during unemployment (October 2014)
Lien Laureys

No. 515 The Bank of England *Credit Conditions Survey* (November 2014)
Venetia Bell and Alice Pugh

No. 516 Mapping the UK interbank system (November 2014)
Sam Langfield, Zijun Liu and Tomohiro Ota

No. 517 Optimal contracts, aggregate risk and the financial accelerator (November 2014)
Timothy S Fuerst, Charles T Carlstrom and Matthias Paustian

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/research/Pages/externalmpcpapers/default.aspx.

The following papers have been published recently:

No. 41 The relevance or otherwise of the central bank's balance sheet (January 2014)
David Miles and Jochen Schanz

No. 42 What are the macroeconomic effects of asset purchases? (April 2014)
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 the Statistics and Regulatory Data Division, Bank of England: telephone 020 7601 5432; email srdd_editor@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 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.

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 Bank of England's Sterling Monetary Framework (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/redbook.pdf.

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's assessment of the latest trends in lending to the UK economy. This report draws mainly on long-established official data sources, such as the existing monetary and financial statistics collected by the Bank that cover all monetary financial institutions, and other data collections established since the start of the financial crisis. These data are supplemented by discussions between the major UK lenders and Bank staff, giving staff a better understanding of the business developments driving the figures and this intelligence is reflected in the report. 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* explores topical issues relating to the Bank's core purposes of monetary and financial stability. Some articles present analysis on current economic and financial issues, and policy implications. Other articles enhance the Bank's public accountability by explaining the institutional structure of the Bank and the various policy instruments that are used to meet its objectives. 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 2015 are as follows:

Quarterly Bulletin		*Inflation Report*	
Q1	12 March	February	11 February
Q2	18 June	May	13 May
Q3	18 September	August	12 August
Q4	15 December	November	11 November

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